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RCRA Facility Investigation – Remedial Investigation/ Corrective Measures Study – Feasibility Study Report for the Rocky Flats Environmental Technology Site

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RCRA Facility Investigation - Remedial Investigation/ Corrective Measures Study - Feasibility Study Report for the Rocky Flats Environmental Technology Site

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ACRONYMS AND ABBREVATIONS

°C	degrees Celsius
µg	microgram
µg/dL	micrograms per deciliter
µg/kg	micrograms per kilogram (may be found as ug/kg)
µg/L	micrograms per liter (may be found as ug/L)
$\mu g/m^3$	microgram per cubic meter
µm	micrometer
4,4'-DDT	4,4'-dichylorodiphenyltrichloroethane
A	Action-specific ARAR
AA	Accelerated Action
AA	atomic absorption
ac-ft	acre-feet
ACGIH	American Conference of Governmental Industrial Hygienists
ACL	Alternate Concentration Limit
AET	apparent effect threshold
AEU	Aquatic Exposure Unit
AI	adequate intake
AL	action level
ALARA	As Low as Reasonable Achievable
ALF	RFCA Attachment 5, RFETS Action Levels and Standards Framework for Surface Water, Ground Water and Soils
Am	americium
AME	Actinide Migration Evaluation

AOC	Area of Concern
AOI	Analytes of Interest
APEN	Air Pollutant Emission Notice
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
ASD	Analytical Services Division
AST	Analytical Services Toolkit
AT	alternative toxicity
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
AWQC	Ambient Water Quality Criteria
BAF	bioaccumulation factor
BDL	below detection limit
Be	beryllium
BGCR	Background Geochemical Characterization Report
bgs	below ground surface
BRA	Baseline Risk Assessment
BSCP	Background Soils Characterization Program
BSF	biota to sediment factor
BW	body weight
BZ	Buffer Zone
BZSAP	Buffer Zone Sampling and Analysis Plan
C	Celsius
C	Chemical-specific ARAR

CAA	Clean Air Act
CAD	Corrective Action Decision
CAD/ROD	Corrective Action Decision/Record of Decision
Cal	California (Environmental Protection Agency)
CAQCC	Colorado Air Quality Control Commission
CAS	Chemical Abstract Service
CB-PEC	consensus-based probable effects concentration
CCC	criterion continuous concentration
CCME	Canadian Council of Ministers of the Environment
CCP	Comprehensive Conservation Plan
CCR	Code of Colorado Regulations
CD	compact disc
CD ROM	Compact Disc- Read Only Memory
CDD	polychlorinated dibenzodioxin
CDF	polychlorinated dibenzofuran
CDH	Colorado Department of Health
CDOW	Colorado Division of Wildlife
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESC	Citizen's Environmental Sampling Committee
CF	chloroform
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second

CHWA	Colorado Hazardous Waste Act
CLP	Contract Laboratory Program
CM	chloromethane
cm	centimeter
cm/sec	centimeters per second
CMC	criterion maximum concentration
CMS	Corrective Measures Study
CNHP	Colorado Natural Heritage Program
CO	carbon monoxide
CO_2	carbon dioxide
CoC	chain of custody
COC	contaminant of concern
CRA	Comprehensive Risk Assessment
CRDL	contract required detection limit
CRMP	Cultural Resource Management Plan
CRS	Colorado Revised Statutes
CSF	cancer slope factor
CSU	Colorado State University
CT	carbon tetrachloride
CWA	Clean Water Act
CWQC	Colorado Water Quality Control
cy	cubic yard
D	difference
D&D	Decontamination and Decommissioning

DAF	dermal absorption factor
DAR	Data Adequacy Report
DCA	dichloroethane
DCE	dichloroethene
DCF	dose conversion factor
DER	duplicate error ratio
DHHS	Department of Health and Human Services
DO	dissolved oxygen
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DPM	disintegration per minute
DQA	Data Quality Assessment
DQO	data quality objective
DRC	data review checklist
DRCOG	Denver Regional Council of Governments
DRI	dietary reference intake
DU	depleted uranium
DU	dilution
ECOC	ecological chemical of concern
ECOI	ecological contaminant of interest
ECOPC	ecological contaminant of potential concern
EcoSSL	ecological soil screening level
EDD	electronic data deliverable
EDE	effective dose equivalent

EE	Environmental Evaluation
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EqP	equilibrium partitioning
ER	Environmental Restoration
ERA	Ecological Risk Assessment
ERL	effect range low
ERM	effects range moderate
ERM	effect range median
ESA	Endangered Species Act
ESA	Endangered Species Act
ESCO	ESCO Associates Inc.
ESL	ecological screening level
ET	evapotranspiration
ETPTS	East Trenches Plume Treatment System
EU	Exposure Unit
F	Fahrenheit
FS	Feasibility Study
ft	foot or feet
FY	fiscal year
g	acceleration due to gravity
g/cm^3	grams per cubic centimeter
GC	gas chromatography

GIS	Geographic Information System
GMU	Game Management Unit
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
HAER	Historic American Engineering Record
handbook	Wildlife Exposure Factors Handbook
HAP	hazardous air pollutant
HEPA	high efficiency particulate air
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
HRR	Historical Release Report
HSL	Hazardous Substance List
IA	Industrial Area
IABZSAP	Industrial Area and Buffer Zone Sampling and Analysis Plan
IAEU	Industrial Area Exposure Unit
IAG	Interagency Agreement
IASAP	Industrial Area Sampling and Analysis Plan
IBI	index of biotic integrity
ICA	Institutional Control Area
ICP	inductively couple plasma
IDEU	Inter-Drainage Exposure Unit
IDL	instrument detection limit
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action

IMP	Integrated Monitoring Plan
IRIS	Integrated Risk Information System
ISQG	interim sediment quality guideline
kg	kilogram
K-H	Kaiser-Hill Company, L.L.C.
L	Location-specific ARAR
L/day	liters per day
LCS	laboratory control sample
LEL	lowest effect level
LFG	landfill gas
LHSU	lower hydrostratigraphic unit
LLW	low-level radioactive waste
Ln	natural logarithmic
LOAEL	lowest observed adverse effect level
LOE	line of evidence
LOEC	lowest observed effect concentration
Log Kow	log octanol-water portioning coefficient
LRA	Lead Regulatory Agency
LWNEU	Lower Walnut Drainage Exposure Unit
LWOEU	Lower Women Drainage Exposure Unit
m	meter
m/s	meters per second
M+2SD	mean plus two standard deviations
MAC	maximum acceptable concentration

MaxDL	maximum daily unit
MaxDL	maximum detection limit
MC	methylene chloride
MCL	maximum contaminant level
MCLG	Maximum Contaminant Level Goal
MDA	minimum detectable activity
MDC	maximum detected concentration
MDL	method detection limit
MENVIQ/EC	Ministere de l'Environnement du Quebec et Environnement Canada
mg	milligram
mg/day	milligrams per day
mg/kg	milligrams per kilogram
mg/kg/BW/day	milligrams per kilogram receptor body weight per day
mg/kg/day	milligrams per kilogram per day
mg/L	milligrams per liter
Mg/yr	megagrams per year
MIDEQ	Michigan Department of Environmental Quality
MK AEU	McKay Ditch Aquatic Exposure Unit
mL	milliliter
mL/day	milliliters per day
mph	miles per hour
mrem	millirem
mrem/yr	millirems per year
MRL	Minimum Risk Level

MS	matrix spike
MSA	method of standard additions
MSD	matrix spike duplicate
msl	mean sea level
MSPTS	Mound Site Plume Treatment System
MSv	millisievert
n	sample size
N/A	not available or not applicable
NAS	National Academy of Sciences
NATA	National-scale Air Toxics Assessment
NAWQC	National Ambient Water Quality Criteria
NC	not calculated
NCP	National Contingency Plan
ND	not detected
NEC	no-effect concentration
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NFAA	No Further Accelerated Action
NHPA	National Historic Preservation Act
NIPHEP	National Institute of Public Health and Environmental Protection
NIST	National Institute of Standards Technology
NLR	no longer representative
NMOC	non-methane organic compound
NN AEU	No Name Gulch Aquatic Exposure Unit

NNEU	No Name Gulch Drainage Exposure Unit
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NREL	National Renewable Energy Laboratory
NW AEU	North Walnut Creek Aquatic Exposure Unit
NWTC	National Wind Technology Center
NYSDEC	New York State Department of Environmental Conservation
O&G	oil and grease
O&M	operation and maintenance
ODS	ozone-depleting substances
OLF	Original Landfill
OMB	Office of Management and Budget
OMOE	Ontario Ministry of the Environment
OPWL	Original Process Waste Lines
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
P.L.	Public Law
PAC	Potential Area of Concern
PAH	polynuclear aromatic hydrocarbon
PAH	polyaromatic hydrocarbon

PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
pCi	picocurie
pCi/g	picocuries per gram
pCi/kg	picocuries per kilogram
pCi/L	picocuries per liter
PCOC	potential contaminant of concern
PDSR	Pre-Demolition Survey Report
PEC	probable effect concentration
PEL	probable effect level; Permissible Exposure Level
PM/PM_{10}	particulate matter; fine particulate matter
PMJM	Preble's meadow jumping mouse
POC	Point of Compliance
POE	Point of Evaluation
ppb	part per billion
PPE	personal protective equipment
ppm	parts per million
PPRTV	Provisional Peer Reviewed Toxicity Value
PPT	pipette
PQL	practical quantitation limit
PRG	preliminary remediation goal
Pu	plutonium
PU&D	Property Utilization and Disposal

PVC	polyvinyl chloride
QA	quality assurance
QAPjP	Quality Assurance Project Plan
QC	quality control
QLI	Quantalex Laboratories, Inc.
RAO	Remedial Action Objective
RBA	relative bioavailability
RBP	Rapid Bioassessment Protocol
RC AEU	Rock Creek Aquatic Exposure Unit
RCEU	Rock Creek Drainage Exposure Unit
RCRA	Resource Conservation and Recovery Act
RDA	recommended daily allowance
RDI	recommended daily intake
RDL	reporting detection limit
RDL	required detection limit
REL	Reference Exposure Level
RESRAD	Residual Radioactivity
RFA	Rocky Flats Alluvium
RfC	Reference Concentration
RFCA	Rocky Flats Cleanup Agreement
RFCAB	Rocky Flats Citizens Advisory Board
RFCOLG	Rocky Flats Counsel of Local Governments
RfD	reference dose
RFEDS	Rocky Flats Environmental Data System

RFETS or Site	Rocky Flats Environmental Technology Site
RFI	RCRA Facility Investigation
RFI/CMS	RCRA Facility Investigation/Corrective Measures Study
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RFNWR	Rocky Flats National Wildlife Refuge
RFPO	Rocky Flats Project Office
RH	Radiation Health
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RL	reporting limit
RLCR	Reconnaissance-Level Characterization Report
RMRS	Rocky Mountain Remediation Services
ROC	receptor of concern
ROD	Record of Decision
RPD	relative percent difference
RRT	Risk Reporting Tool
RSAL	radionuclide soil action level
SAP	Sampling and Analysis Plan
SCM	site conceptual model
SCMTM	site conceptual model technical memorandum
SCS	Soil Conservation Service
SDP	standard data package
SE AEU	Southeast Aquatic Exposure Unit
SEC	sediment effect concentration

SEEU	Southeast Buffer Zone Area Exposure Unit
SEP	solar evaporation ponds
SEV	severity of ill effect
SHPO	State Historic Preservation Office
SID	South Interceptor Ditch
SMDP	scientific management decision point
SO_2	sulfur dioxide
SOW	Statement of Work
SPPTS	Solar Ponds Plume Treatment System
SQC	soil quality criteria
SQG	sediment quality guideline
SQL	sample quantitation limit
SQL	Structured Query Language
SR	Summary Report
StDev	standard deviation
STP	standard temperature and pressure
SVOC	semivolatile organic compound
SW AEU	South Walnut Creek Aquatic Exposure Unit
SWD	Soil Water Database
SWEU	Southwest Buffer Zone Area Exposure Unit
SWMU	Solid Waste Management Unit
SWWB	Site-Wide Water Balance
TAL	Target Analyte List
TBC	To-Be-Considered

TCDD	tetrachlorodibenzodioxin
TCE	trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TEC	threshold effect concentration
TEDE	total effective dose equivalent
TEF	toxicity equivalency factor
TEL	toxic effects level
TEQ	toxic equivalency
tESL	threshold ecological screening level
TET	toxic effect threshold
TIC	tentatively identified compound
TLV	Threshold Limit Value
TMDL	total maximum daily load
TNRCC	Texas Natural Resource Conservation Commission
TOC	total organic carbon
TRV	toxicity reference value
TSS	total suspended solids
TTHM	trihalomethanes
U	nondetected; uranium
U.S.	United States
U.S.C.	U.S. Code
UBC	Under Building Contamination

UCL	upper confidence limit
UDFCD	Urban Drainage and Flood Control District
UHSU	upper hydrostratigraphic unit
UL	upper limit daily intake
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UT	uncertain toxicity
UTL	upper tolerance limits
UWNEU	Upper Walnut Drainage Exposure Unit
UWOEU	Upper Woman Drainage Exposure Unit
V&V	verification and validation
VC	vinyl chloride
VFA	Valley Fill Alluvium
VOC	volatile organic compound
WAEU	West Area Exposure Unit
WBEU	Wind Blown Area Exposure Unit
WC AEU	Woman Creek Aquatic Exposure Unit
WHO	World Health Organization
WQCC	Water Quality Control Commission
WRS	Wilcoxon Rank Sum

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WRV	wildlife refuge visitor
WRW	wildlife refuge worker
WSF	West Spray Field
yr/pCi/g	years per picocurie per gram

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Section 4.0
Nature and Extent of Groundwater Contamination

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4.0 NATURE AND EXTENT OF GROUNDWATER CONTAMINATION

4.1 Introduction

The purpose of this section is to define the current nature and extent of groundwater analytes of interest (AOIs) at the Rocky Flats Environmental Technology Site (RFETS or site) after the accelerated actions are complete. In determining the horizontal and vertical extent of groundwater AOIs, this section evaluates groundwater constituents present in both the upper hydrostratigraphic unit (UHSU) and the lower hydrostratigraphic unit (LHSU) at RFETS. The UHSU at RFETS consists of the unconsolidated surficial deposits, weathered bedrock, and sandstones (for example, the Arapahoe No. 1 Sandstone) hydraulically connected to the overlying strata. The LHSU is composed of the unweathered bedrock of the Arapahoe and upper Laramie Formations that underlie the UHSU. AOIs are those analytes that are present above background concentrations and surface water standards[1] or drinking water maximum contaminant levels (MCLs)[2] and form contiguous, mappable contaminant plumes. Groundwater AOIs identified in this section will be further evaluated in Section 7.0.

Data used in this section are the result of previous investigations conducted at the site, from sitewide sampling programs, samples collected after accelerated actions were implemented, and samples collected during the sitewide Remedial Investigation/Feasibility Study (RI/FS) effort to support the Comprehensive Risk Assessment (CRA). This groundwater nature and extent evaluation is based on data collected between June 28, 1991,[3] and July 31, 2005. Section 4.2 presents a brief chronology of groundwater monitoring at RFETS to provide a historical perspective of groundwater characterization and monitoring at the site.

4.2 Groundwater Monitoring at RFETS

Groundwater monitoring has been conducted at RFETS since the first groundwater monitoring wells were installed in the vicinity of the original Solar Evaporation Ponds (SEP) in 1954. Additional wells were installed in 1960, 1966, and 1971. Until 1974, groundwater monitoring focused primarily on the detection of select radionuclides and major ions (for example, nitrate and fluoride), and the measurement of pH (Boss 1973). Additional wells were installed, and the groundwater monitoring program was expanded in 1974 in conjunction with the U.S. Department of Energy (DOE) and U.S. Geological Survey (USGS) efforts to characterize the hydrology of the site (Hurr 1976). Additional wells were installed in 1981 and 1982 as part of the first Resource Conservation and Recovery Act (RCRA) groundwater monitoring program. The groundwater monitoring program was expanded significantly in 1986 when DOE entered

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[1] See Section 4.4.3 for the source of surface water quality standards applied to RFETS groundwater.

[2] MCLs have been established by the U.S. Environmental Protection Agency (EPA) for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed in 40 Code of Federal Regulations (CFR) 141. Where an MCL for a particular contaminant is lacking, the residential groundwater ingestion-based preliminary remediation goal (PRG) will apply. If the practical quantitation limit (PQL) is higher than the surface water standard, MCL, or PRG, the PQL is used as the comparison value. For simplicity, MCLs, PRGs, and PQLs are hereinafter referred to as MCLs.

[3] This date correlates to the approval of work plans and Sampling and Analysis Plans (SAPs) developed pursuant to the 1991 Interagency Agreement (IAG).

into a Compliance Agreement with the State of Colorado, followed by the site being added to the National Priority List (NPL) by the U.S. Environmental Protection Agency (EPA) in 1989. Groundwater monitoring after 1986 included hazardous, nonhazardous, and radiological constituents to facilitate a comprehensive understanding the nature and extent of groundwater contamination.

In 1991, DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) entered into the Interagency Agreement (IAG), which was superseded by the Rocky Flats Cleanup Agreement (RFCA) in 1996. The Integrated Monitoring Plan (IMP), required under RFCA to implement environmental media monitoring programs at the site, serves as the current groundwater monitoring plan for RFETS. The IMP outlines the monitoring goals for groundwater and describes the various components of the groundwater monitoring program. The IMP, originally published in May 1997, replaced the Groundwater Protection and Monitoring Program Plan (EG&G 1993a). Since Fiscal Year (FY) 2004, the IMP has been updated quarterly (as needed) and annually to reflect changes to the monitoring programs.

IMP updates include input derived from consultation with the regulatory agencies (EPA and CDPHE), cities, and stakeholders. This consultative process determined the locations of new monitoring wells, analytical suites for new and existing monitoring wells, well abandonment and replacement, and the overall design of the current monitoring network. Agency and community input was obtained by DOE, and DOE strategies were transmitted to the communities through quarterly information exchange and Water Working Group meetings. In addition, IMP meetings were frequently scheduled to address the evolving nature of the IMP as the site moved toward closure. City and stakeholder participants included, but were not limited to, representatives of the City and County of Broomfield, City of Arvada, City of Westminster, City of Northglenn, City of Thornton, Rocky Flats Coalition of Local Governments (RFCLOG), and Rocky Flats Citizens Advisory Board (RFCAB).

Table 4.1 presents a summary of well installation and routine monitoring activities at the site to date. In the following discussion and Table 4.1, the term wells also includes well points and piezometers, which were generally installed to measure water levels, but were properly developed and used to periodically collect groundwater samples for analysis. However, not all of the wells listed in Table 4.1 have been sampled and analyzed for groundwater constituents. Wells that were not sampled did not meet the data quality objectives (DQOs) of the project.

Table 4.2 provides a summary of the well completion details of the wells used in the groundwater nature and extent evaluation.

4.3 Groundwater Data

4.3.1 Data Source

Groundwater data used in this evaluation were extracted from the Soil Water Database (SWD) using procedures developed to support the CRA (Appendix A, Volume 2, Attachment 2). The groundwater data extracted consisted of analytical records that represent the time period from June 28, 1991 to July 31, 2005. Only data deemed "CRA Ready = Yes" were used in this evaluation. Additional data reduction steps are included in Attachment 1. Groundwater data

have been collected from 939 UHSU wells (Figure 4.1) and 68 LHSU wells (Figure 4.2) since June 28, 1991. These records include analytical results for pesticides, herbicides, fungicides, aroclors (polychlorinated biphenyls [PCBs]), dioxins, furans, semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), total and dissolved metals, total and dissolved radionuclides, and water quality parameters.

Data that were used to evaluate the groundwater nature and extent included 529,055 records, including 488,621 records for the UHSU and 40,434 records for the LHSU. These data included 1,607 records for tentatively identified compounds (TICs). TICs found in the groundwater data are organic compounds that do not have surface water standards or MCLs and were not further evaluated. Specific data used for evaluation of the groundwater nature and extent are described below and presented on a compact disk read-only memory (CD ROM) in Attachments 1 (UHSU) and 2 (LHSU).

4.3.2 Data Adequacy and Data Quality

Groundwater data adequacy and quality of the data used in to evaluate groundwater nature and extent were evaluated in Appendix A, Volume 2, Attachments 2 and 3. The distribution of data, both spatially and temporally, was assessed to ensure that the nature and extent of contamination is well characterized. The results of the data adequacy assessment are presented in the Data Adequacy Report (Appendix A, Volume 2, Attachment 3). Data quality was assessed using a standard precision, accuracy, representativeness, completeness, and comparability (PARCC) parameter analysis (EPA 2000). The Data Quality Assessment presented in Appendix A, Volume 2, Attachment 2 is based on an evaluation of site-wide field and laboratory control samples. Data used to evaluate groundwater nature and extent met data adequacy and data quality criteria for the CRA.

4.4 Identification of Groundwater AOIs

Groundwater AOIs were identified using the screening approach shown on Figure 4.3. This approach is described in the following sections. Groundwater analytes listed in Table 4.3 for the UHSU and Table 4.4 for the LHSU were screened using this approach to determine the AOIs for these hydrostratigraphic units.

4.4.1 AOI Screening Step 1 – Background Comparison

Groundwater analyte results were compared against background values where available. The background values used for comparison were obtained from Tables C-6 through C-10 in Appendix C of the Background Geochemical Characterization Report (DOE 1993). These values are 99/99 upper tolerance limits (UTLs) for various constituents by flow system (for example, UHSU or LHSU). A 99/99 UTL defines a value that contains 99 percent of the population with 99 percent confidence.

Background values are not available for organic constituents and other select inorganic and radionuclide constituents. In this evaluation, detection of these constituents above the detection limit indicates their presence in the environment. Laboratory qualifier codes were used to identify whether a constituent is detected or not.

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In AOI Screening Step 1, groundwater analytical results are compared with the corresponding background value (99/99 UTL). For those analytes where all past sample results are below the corresponding background concentration, the analyte is eliminated as a potential AOI. Analytes that have at least one sample result above the background concentration are carried forward to AOI Screening Step 2. For analytes that do not have a 99/99 UTL (for example, organic constituents) and are detected above the detection limits, this screening step is skipped and the analyte proceeds to AOI Screening Step 2.

4.4.2 AOI Screening Step 2 – Determination of Surface Water Standard

To evaluate the potential for impacts to surface water quality, AOI Screening Step 2 determines whether a surface water standard exists for the groundwater constituent. For groundwater constituents that have a surface water standard and appropriate methodology (that is, total versus dissolved analysis; Table 4.3 and Table 4.4), the constituent is carried forward to AOI Screening Step 3. For groundwater constituents without a surface water standard, the constituent proceeds to AOI Screening Step 4, where it is compared to MCLs.

4.4.3 AOI Screening Step 3 – Surface Water Standard Comparison

The Colorado Water Quality Regulations apply surface water standards as the groundwater quality standards for RFETS groundwater with the use classification defined as surface water quality protection (see 5 Colorado Code of Regulations [CCR] 1002-42.7[1][4]). The surface water quality standards applied to groundwater are the RFETS site-specific and statewide standards in 5 CCR 1002:

- Statewide surface water radioactive materials standards in Section 31.11(2);[5]
- Statewide surface water interim organic pollutant standards in Section 31.11(3);[6] and
- Site-specific surface water quality standards for segments 4a, 4b, and 5 of Big Dry Creek in Section 38.6[6] of the South Platte Basin Classifications and Standards.

In AOI Screening Step 3, groundwater results are compared with the corresponding surface water standard. The surface water standard is defined as the greater of the lowest surface water standard or the practical quantitation limit (PQL). Basic surface water standards considered include water supply, water + fish, fish ingestion, acute aquatic, chronic aquatic, aquatic life class 2, agriculture, and site-specific surface water standards for Walnut and Woman Creeks.

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[4] Colorado Water Quality Control Commission (WQCC) Regulation No. 42, Site-Specific Water Quality Classifications and Standards for Groundwater (5 CCR 1002-42), Amended August 13, 2001, Effective September 30, 2001.

[5] Colorado WQCC Regulation No. 31, The Basic Standards and Methodologies for Surface Water (5 CCR 1002-31), Amended November 8, 2004, Effective March 22, 2005.

[6] Colorado WQCC Regulation No. 38, Classifications and Numeric Standards South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin (5 CCR 1002-38), Amended September 13, 2004, Effective January 20, 2005.

For groundwater analytes where all sample results are below the surface water standard, the analyte is eliminated as an AOI. Groundwater analytes that have at least one sample result above the surface water standard are retained, and the analyte proceeds to AOI Screening Step 5.

4.4.4 AOI Screening Step 4 – MCL Comparison

To evaluate the drinking water exposure pathway for those constituents that do not have a surface water standard, in AOI Screening Step 4 groundwater results are compared with the corresponding MCL.[7] For groundwater analytes where sample results are below the MCL, the analyte is eliminated as an AOI. Groundwater analytes that have one or more sample results above the MCL are retained, and the analyte proceeds to AOI Screening Step 5.

4.4.5 AOI Screening Step 5 – Determination of Contiguous, Mappable Plume

For each analyte that passes Screening Step 3 or 4, the most recent available sample result from each well is mapped to assess whether a contiguous, mappable plume exists. The most recent result at a well was selected to reflect current groundwater conditions at the site. A contiguous, mappable plume is defined as three or more adjacent wells with groundwater results that exceed the respective surface water standard or MCL. Based on the extensive well coverage at RFETS, three adjacent wells with groundwater contaminants above these standards are used as a basis for defining a contiguous plume for the following reasons:

- One well represents a potentially isolated occurrence of groundwater contamination.
- Two adjacent wells represent a localized occurrence of groundwater contamination with potentially limited spatial extent.
- Three or more adjacent wells represent a sufficient spatial extent to define a mappable, contiguous contaminant plume area.

The surface water standard or MCL is used in Screening Step 5 to delineate boundaries for a contiguous, mappable contaminant plume.

A contiguous, mappable contaminant plume is based on a number of factors including the relative location of adjacent wells, groundwater flow directions, and likely contaminant plume widths that result in a professional judgment as to the contiguous, mappable nature of potential groundwater contamination. Specifically,

- The relative location of adjacent wells was based on an approximate radius of 300 feet from a well(s) with contaminant concentrations above the surface water standard or MCL. This distance was derived during the development of plume isopleth maps for an RFETS report on the natural attenuation and biodegradation of volatile organic compounds in groundwater (K-H 2004).

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[7] Based on using Colorado Water Quality Control Commission Regulation No. 41, The Basic Standards for Groundwater (5 Colorado Code of Regulations [CCR] 1002-41), Amended November 8, 2004, Effective March 22, 2005.

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- Groundwater flow directions were obtained from the Site-Wide Water Balance Report (K-H 2002).
- The approximate width and length of contaminant plumes at RFETS were estimated in the RFETS report on natural attenuation and biodegradation of volatile organic compounds in groundwater (K-H 2004). Furthermore, median plume widths of chlorinated solvent plumes have been estimated by Aziz et al. (2000) as ranging between 300 and 750 feet. Because lateral dispersion is typically weak (Pankow and Cherry 1996), the width of contaminant plumes is largely dependent on the width of the source area, which at RFETS appears to be limited to 300 feet or less.

If a contiguous, mappable plume does not exist, the analyte is eliminated as an AOI. If a contiguous, mappable plume does exist, the analyte is retained and proceeds to AOI Screening Step 6.

4.4.6 AOI Screening Step 6 – Process Knowledge Evaluation

AOI Screening Step 6 involves the determination of whether a constituent that has a contiguous, mappable extent should be retained or eliminated as an AOI based on process knowledge or other criteria involving professional judgment. This screen involves an assessment of contaminants that cannot be reasonably expected to be AOIs based on historic site process knowledge, even though they may appear to form contiguous contaminant extents. AOI Screening Step 6 also involves other criteria (for example, stainless steel wells or pumps, improper well completion, aquifer geochemistry, and process knowledge) based on professional judgment, that may lead to the elimination of an analyte as an AOI. Process knowledge of a constituent's historical use at the site, or lack of use, and professional judgment involving an understanding of a constituent's natural occurrence and distribution in the environment, regional and local aquifer geochemistry, and well completion and sampling information, all provide useful information regarding whether a constituent is an AOI at the site.

For example, cross-contamination of a monitored interval can occur during borehole drilling and well completion by dragging contaminated surface soil down into the screened interval resulting in misleading groundwater results. An example of this has been shown for americium-241 and plutonium-239/240 at the 903 Pad by comparing the results of traditionally- and aseptically-installed wells (Santschi, P.H. and K. Roberts, 2002).

4.4.7 Results of UHSU AOI Screening

Based on the groundwater AOI screening process shown on Figure 4.3, 18 UHSU groundwater AOIs were identified and retained, including 11 VOCs, 4 metals, 1 radionuclide, and 2 water quality parameters. The frequency of detection for the UHSU AOIs above the surface water standards or MCLs ranges between greater than 0 percent and less than 1 percent (3 constituents), 1 to less than 5 percent (4 constituents), and greater than 5 percent (11 constituents). The rationale for AOIs eliminated based on process knowledge or professional judgment (Screening Step 6) are summarized in Table 4.5.

Groundwater AOIs identified and retained for the UHSU are listed in Table 4.6 along with summary statistics for each constituent. The summary statistics are based on all results

collected between June 28, 1991 and July 31, 2005 for each constituent. The information presented in this table is listed in order of increasing frequency of detection above the lowest surface water standard or PQL (whichever is higher). Figure 4.4 shows the location of site features discussed in the following sections. Figure 4.5 through Figure 4.22 show the nature and extent of UHSU AOIs. The extent of other constituents evaluated in the UHSU that were not retained as AOIs are included on a CD ROM as Figures A1.1 through A1.201 in Attachment 1.

4.4.7.1 PCBs and Dioxins

No PCB or dioxin AOIs were identified in UHSU groundwater. Table 4.3 summarizes PCB and dioxin compounds analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU PCB and dioxin AOIs that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of PCBs and dioxins evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.1 through A1.10).

4.4.7.2 Pesticides, Herbicides, and Fungicides

No pesticides, herbicides, or fungicides were identified as AOIs in UHSU groundwater. Table 4.3 summarizes pesticide, herbicide, and fungicide compounds analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU pesticide, herbicide, and fungicide AOIs that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of pesticides, herbicides, and fungicides evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.11 through A1.37).

4.4.7.3 SVOCs

No SVOCs were identified as AOIs in UHSU groundwater. Table 4.3 summarizes SVOC compounds analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU SVOC AOIs that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of SVOCs evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.38 through A1.101).

4.4.7.4 VOCs

Table 4.3 summarizes VOCs analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU VOCs that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of VOCs evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.102 through A1.139). Table 4.6 lists 11 VOCs that were analyzed for and reported in the UHSU data evaluated and retained as AOIs. See Section 4.5.1.1 and Figure 4.5 through Figure 4.15 for a discussion and maps of VOC AOIs.

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4.4.7.5 Metals

Table 4.3 summarizes metals analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU metals that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of metals evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.140 through A1.174). Table 4.6 lists four metals analyzed for and reported in the UHSU data evaluated and retained as AOIs. See Section 4.5.1.2 and Figure 4.16 through Figure 4.19 for a discussion and maps of metal AOIs.

4.4.7.6 Radionuclides

Table 4.3 summarizes radionuclides analyzed for and reported in the UHSU data evaluated, but not retained as AOIs. UHSU radionuclides that had activities above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.3. The extent of radionuclides evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.175 through A1.194). Table 4.6 lists one radionuclide analyzed for and reported in the data evaluated and retained as an AOI. See Section 4.5.1.3 and Figure 4.20 for a discussion and map of the only radionuclide AOI.

4.4.7.7 Water Quality Parameters

Table 4.3 summarizes water quality parameters analyzed for and reported in the data evaluated, but not retained as AOIs. UHSU water quality parameters that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells are shown highlighted in Table 4.3. The extent of water quality parameters evaluated in the UHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 1 (Figures A1.195 through A1.201). Table 4.6 lists two water quality parameters analyzed for and reported in the data evaluated and retained as AOIs. See Section 4.5.1.4 and Figure 4.21 and Figure 4.22 for a discussion and maps of water quality parameter AOIs.

4.4.8 Results of LHSU AOI Screening

Based on the groundwater AOI screening process shown on Figure 4.3, no groundwater AOIs were identified in the LHSU. The LHSU constituent extent maps for groundwater constituents not retained as AOIs are included on a CD ROM as Figures A2.1 through A2.209 in Attachment 2. The rationale for groundwater AOIs eliminated based on process knowledge or professional judgment (Screening Step 6) are summarized in Table 4.5.

In evaluating the nature and extent of groundwater contaminants in the LHSU, given the wide distribution of wells, the conclusions of several studies were also considered along with the screening process (Figure 4.3) to determine the potential for contaminant plumes in the LHSU. An evaluation of well completion details, the presence or absence of overlying contamination in the UHSU, and the potential for LHSU to impact surface water quality was also considered in the LHSU evaluation. All of this information was used to determine whether potential AOIs should be retained or eliminated.

In 1996, an evaluation of vertical contaminant migration potential between the UHSU and the LHSU was performed for the site (RMRS 1996) to determine whether trace contaminants found in the LHSU were derived from vertical migration of constituents from the UHSU. This study concluded that the LHSU is essentially hydraulically isolated from the UHSU. Hydraulic isolation is due to the LHSU groundwater existing in low-permeability claystones and vertical contaminant transport was likely limited. Furthermore, many of the trace contaminants found in LHSU groundwater may have resulted from cross-contamination during well installation.

Background geochemical characterization of the UHSU and LHSU, based on major ion and stable isotope geochemistry, revealed that these units have different groundwater chemistry (EG&G 1993b, 1995a, 1995b). This provides further evidence of their hydraulic isolation from one another and also strongly suggests that contaminants in the UHSU and upper LHSU do not pose a threat to water quality in the deeper Laramie-Fox Hills Aquifer (RMRS 1996). Furthermore, vertical hydraulic gradients between the UHSU and the LHSU generally indicated that vertical groundwater flow is from the UHSU to the underlying LHSU. This further suggests that groundwater in the LHSU does not discharge to surface water, and, thus, groundwater in the LHSU poses no threat to surface water quality (RMRS 1996; EG&G 1995a).

4.4.8.1 PCBs and Dioxins

No PCBs or dioxins were identified as AOIs in LHSU groundwater. Table 4.4 summarizes PCB and dioxin compounds analyzed for and reported in the LHSU data evaluated. Only hexachlorodibenzo-p-dioxin was detected above the surface water standard at least once, but was not detected in three adjacent wells, and is shown highlighted in Table 4.4. The extent of PCBs and dioxins evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.1 through A2.10).

4.4.8.2 Pesticides, Herbicides, and Fungicides

No pesticides, herbicides, or fungicides were identified as AOIs in LHSU groundwater. Table 4.4 summarizes pesticide, herbicide, and fungicide compounds analyzed for and reported in the LHSU data evaluated. None of the pesticide, herbicide, or fungicide concentrations exceeded the surface water standards or MCLs. The extent of pesticides, herbicides, and fungicides evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.11 through A2.36).

4.4.8.3 SVOCs

No SVOCs were identified as AOIs in LHSU groundwater. Table 4.4 summarizes SVOCs analyzed for and reported in the LHSU data evaluated. Only bis(2-ethylhexyl)phthalate was above the surface water standard at least once, but was not detected in three adjacent wells, and is shown highlighted in Table 4.4. The extent of SVOCs evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.37 through A2.98).

4.4.8.4 VOCs

No VOCs were identified as AOIs in LHSU groundwater. Table 4.4 summarizes VOCs analyzed for and reported in the LHSU data evaluated. LHSU VOCs that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.4. The extent of VOCs evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.99 through A2.146).

4.4.8.5 Metals

No metals were identified as AOIs in LHSU groundwater. Table 4.4 summarizes metal constituents analyzed for and reported in the LHSU data evaluated. LHSU metal constituents that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.4. The extent of metals evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.147 through A2.183).

4.4.8.6 Radionuclides

No radionuclides were identified as AOIs in LHSU groundwater. Table 4.4 summarizes radionuclides analyzed for and reported in the LHSU data evaluated. LHSU radionuclides that had activities above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.4. The extent of radionuclides evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.184 through A2.200).

4.4.8.7 Water Quality Parameters

No water quality parameters were identified as AOIs in LHSU groundwater. Table 4.4 summarizes water quality parameters analyzed for and reported in the LHSU data evaluated. LHSU water quality parameters that had concentrations above the surface water standards or MCLs at least once, but were not detected in three adjacent wells, are shown highlighted in Table 4.4. The extent of water quality parameters evaluated in the LHSU that were not retained as AOIs are shown on the AOI extent maps in Attachment 2 (Figures A2.201 through A2.209).

4.5 Nature and Extent of Groundwater Contamination

This section summarizes the nature and extent of groundwater contamination at RFETS. Eighteen AOIs were identified in UHSU groundwater at RFETS and their nature and extent are discussed below. No AOIs were identified in the LHSU.

For each of the 18 AOIs identified for the UHSU, maps were created to show the relative concentration and extent of AOIs at the site. These figures are presented as Figure 4.5 through Figure 4.22. For each figure, the results are displayed as six categories, as listed below, to identify the predominant areas of contaminant occurrence and extent:

- Locations where the AOI is not detected (gray);
- Locations where the AOI is detected but is less than or equal to the 99/99 UTL (blue). For organic constituents and other constituents without a 99/99 UTL, the 99/99 UTL is not applicable because background is assumed to be zero for these constituents;
- Locations where the AOI is detected but is less than or equal to the surface water standard (that is, lowest surface water standard or PQL, whichever is higher) (green);
- Locations where the AOI concentration is greater than the surface water standard and less than or equal to the MCL (yellow);
- Locations where the AOI concentration is greater than the MCL and less than or equal to 100 times the MCL (orange); and
- Locations where the AOI concentration is greater than 100 times the MCL (red).

AOI sampling location symbols are designed to show the approximate 5-year time interval that the sample was collected. The time intervals identified on the AOI extent figures are defined as:

- Sample collected between June 28, 1991, and December 31, 1994;
- Sample collected between January 1, 1995, and December 31, 1999; and
- Sample collected since January 1, 2000.
- These figures were constructed in a manner to avoid overposting of well locations where the potential AOI exceeded the standard. The AOI categories were layered so that the locations exceeding the standard are posted as the top layer and locations less than the standard are posted on the lower layers. If overposting occurs, the locations that exceed the standard are overposted on locations that do not exceed the standard. Thus, locations that exceed the standard are not obscured by locations that are less than the standard.

4.5.1 Extent of AOIs in UHSU Groundwater

Each of the UHSU groundwater AOIs is mapped on Figure 4.5 through Figure 4.22 and is discussed by analyte group below. Figure 4.4 shows the location of site features discussed in the text. Groundwater AOI constituent plume maps are shown in Section 7.0.

4.5.1.1 VOCs

Benzene, carbon tetrachloride, chloroform, chloromethane, cis-1,2-dichloroethene, 1,1-dichlorethene, 1,2-dichloroethane, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride were identified as AOIs in UHSU groundwater (Table 4.6). Figure 4.5 through Figure 4.15 show the areal distribution of the VOC AOIs in UHSU groundwater.

Figure 4.5 shows the extent of 1,1-dichloroethene in UHSU groundwater. 1,1-Dichloroethene concentrations in UHSU groundwater are above the surface water standard (3.8 percent), MCL (3.8 percent), and 100 times the MCL (0.4 percent). 1,1-Dichloroethene occurrences above these standards are primarily found at Oil Burn Pit #2, the Mound area, the East Trenches

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area, the 903 Pad, Individual Hazardous Substance Site (IHSS) 119.1 (Operable Unit [OU1]), the Property Utilization and Disposal (PU&D) Yard, Building 771, and an area southeast of Building 371.

Figure 4.6 shows the extent of 1,2-dichloroethane in UHSU groundwater. 1,2-Dichloroethane concentrations in UHSU groundwater are above the surface water standard (1.0 percent) and MCL (0.6 percent), but less than 100 times the MCL. 1,2-Dichloroethane occurrences above these standards are primarily found in the Mound area.

Figure 4.7 shows the extent of benzene in UHSU groundwater. Benzene concentrations in UHSU groundwater are above the surface water standard (0.6 percent) and MCL (0.4 percent), but less than 100 times the MCL. Benzene occurrences above these standards are primarily found beneath the Present Landfill.

Figure 4.8 shows the extent of carbon tetrachloride in UHSU groundwater. Carbon tetrachloride concentrations in UHSU groundwater are above the surface water standard (19.7 percent), MCL (16.2 percent), and 100 times the MCL (5.1 percent). Carbon tetrachloride occurrences above these standards are primarily found south of Building 771 (Carbon Tetrachloride Plume, IHSS 118.1), Mound area, in the East Trenches area, the 903 Pad and Ryan's Pit area, IHSS 119.1 (OU1), and the central Industrial Area (IA) plumes.

Figure 4.9 shows the extent of chloroform in UHSU groundwater. Chloroform concentrations in UHSU groundwater are above the surface water standard (15.1 percent), MCL (3.8 percent), and 100 times the MCL (0.2 percent). Chloroform occurrences above these standards are primarily found at Building 771 (IHSS 118.1), the East Trenches area, the 903 Pad and Ryan's Pit area, Oil Burn Pit #2, and the Mound area.

Figure 4.10 shows the extent of chloromethane in UHSU groundwater. Chloromethane concentrations in UHSU groundwater are above the surface water standard (0.4 percent) and MCL (0.4 percent), but less than 100 times the MCL. Chloromethane occurrences above these standards are primarily found near Building 771 (IHSS 118.1) and Building 559.

Figure 4.11 shows the extent of cis-1,2-dichloroethene in UHSU groundwater. Cis-1,2-dichloroethene concentrations in UHSU groundwater are above the surface water standard (3.8 percent) and MCL (3.8 percent), but less than 100 times the MCL. Cis-1,2-dichloroethene occurrences above these standards are primarily found at Oil Burn Pit #1 near Building 335 and the Mound area.

Figure 4.12 shows the extent of methylene chloride in UHSU groundwater. Methylene chloride concentrations in UHSU groundwater are above the surface water standard (5.0 percent), MCL (4.8 percent), but less than 100 times the MCL. Methylene chloride occurrences above these standards are primarily found near Building 771 (IHSS 118.1), and the Mound area.

Figure 4.13 shows the extent of tetrachloroethene in UHSU groundwater. Tetrachloroethene is one of the most common and widespread VOC contaminants in groundwater at RFETS. Tetrachloroethene concentrations in UHSU groundwater are above the surface water standard (29.5 percent), MCL (20.7 percent), and 100 times the MCL (2.7 percent). Tetrachloroethene

occurrences above these standards are primarily found in the East Trenches area, the 903 Pad and Ryan's Pit area, Buildings 443 and 444, IHSS 119.1 (OU1), Oil Burn Pit #2, the Mound area, near Building 771 (IHSS 118.1), the PU&D Yard, and the central IA plumes.

Figure 4.14 shows the extent of trichloroethene in UHSU groundwater. Trichloroethene is one of the most common and widespread VOC contaminants in groundwater at RFETS. Trichloroethene concentrations in UHSU groundwater are above the surface water standard (26.4 percent), MCL (22.8 percent), and 100 times the MCL (4.3 percent). Trichloroethene occurrences above these standards are primarily found in the East Trenches area, the 903 Pad and Ryan's Pit area, south of Building 440, IHSS 119.1 (OU1), Oil Burn Pit #1, Oil Burn Pit #2, the Mound area, east of Building 371, the PU&D Yard, the SEP (Pond 207-C), and the central IA plumes.

Figure 4.15 shows the extent of vinyl chloride in UHSU groundwater. Vinyl chloride concentrations in UHSU groundwater are above the surface water standard (2.0 percent), MCL (2.0 percent), and 100 times the MCL (0.3 percent). Vinyl chloride occurrences above these standards are primarily found at Oil Burn Pit #1 near Building 335, the Mound area, the Present Landfill, the Building 551 Warehouse, and the PU&D Yard.

4.5.1.2 Metals

Dissolved arsenic, total chromium, and dissolved and total nickel were identified as metal AOIs in UHSU groundwater (Table 4.6). Figure 4.16 through Figure 4.19 show the areal distribution of the metal AOIs in UHSU groundwater. Total constituent concentrations are determined using unfiltered samples and represent both aqueous and suspended particulate transport of constituents. Dissolved constituent concentrations are determined using a sample filtered through a 0.45-micron filter and represent aqueous transport of constituents.

Figure 4.16 shows the extent of dissolved arsenic in UHSU groundwater. Dissolved arsenic concentrations in UHSU groundwater are above the surface water standard (4.3), MCL (0.1), but less than 100 times the MCL. Dissolved arsenic occurrences above these standards are primarily found at the Present Landfill.

Figure 4.17 shows the extent of total chromium in UHSU groundwater. Total chromium concentrations in UHSU groundwater are above the surface water standard (14.0 percent) and MCL (6.9 percent), but less than 100 times the MCL. Total chromium occurrences above these standards are primarily found near Building 771, the East Trenches area, south of the 903 Pad, and IHSS 119.1 (OU1).

Figure 4.18 shows the extent of dissolved nickel in UHSU groundwater. Dissolved nickel concentrations in UHSU groundwater are above the surface water standard (4.0 percent) and MCL (2.2 percent), but less than 100 times the MCL. Dissolved nickel occurrences above these standards are primarily found at Building 850, IHSS 119.1 (OU1), and southeast of Ryan's Pit.

Figure 4.19 shows the extent of total nickel in UHSU groundwater. Total nickel concentrations in UHSU groundwater are above the surface water standard (8.3 percent) and MCL (6.1 percent), but less than 100 times the MCL. Dissolved nickel occurrences above

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these standards are primarily found at Building 850, the SEPs, the East Trenches area, southeast of Ryan's Pit, north of Building 771, and IHSS 119.1 (OU1).

4.5.1.3 Radionuclides

Total uranium isotopes (that is, the sum of the uranium isotopes [U-233,2334, U-235, and U-238]) was the only radionuclide AOI identified in UHSU groundwater (Table 4.6). Figure 4.20 shows the extent of total uranium isotopes in UHSU groundwater. Total uranium isotopes in UHSU groundwater occur at concentrations above the surface water standard (37.7 percent), MCL (22.4 percent), and 100 times the MCL (0.3 percent). Total uranium isotope occurrences above these standards are primarily found in the area of the SEPs and North Walnut Creek upstream of Pond A-1, the Original Landfill, and the Ash Pits.

4.5.1.4 Water Quality Parameters

Fluoride and nitrate/nitrite (as N) were identified as water quality parameter AOIs in UHSU groundwater (Table 4.6). Figure 4.21 and Figure 4.22 show the areal distribution of the water quality parameter AOIs in UHSU groundwater. Both of these AOIs have a greater than 5 percent frequency of detection above their respective surface water standard.

Figure 4.21 shows the extent of fluoride in UHSU groundwater. Fluoride in UHSU groundwater occurs at concentrations above the surface water standard (7.8 percent) and MCL (1.7 percent); but less than 100 times the MCL. Fluoride occurrences above the standards are found in the area of the SEP, IHSS 119.1 (OU1), in the area of Building 881, and east of the Present Landfill.

Figure 4.22 shows the extent of nitrate/nitrite (as N) in USHU groundwater. Nitrate/nitrite (as N) is the most common and widespread water quality parameter contaminant at RFETS. Nitrate/nitrite (as N) in UHSU groundwater occurs at concentrations above the surface water standard (14.9 percent), MCL (14.9 percent), and 100 times the MCL (1.8 percent). Nitrate/nitrite (as N) occurrences above these standards are found in the area of the SEPs and North Walnut Creek above Pond A-1, the 903 Pad, and IHSS 119.1 (OU1).

4.5.2 Summary of UHSU AOIs

Eighteen AOIs were identified in the UHSU. These AOIs include 11 VOCs (benzene, carbon tetrachloride, chloroform, chloromethane, cis-1,2-dichloroethene, 1,1-dichloroethene, 1,2-dichloroethane, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride), 4 metals (dissolved arsenic, total chromium, and dissolved and total nickel), 1 radionuclide (total uranium isotopes), and 2 water quality parameters (fluoride and nitrate/nitrite (as N)). All of these groundwater AOIs occur above their respective surface water standard and locally form contiguous, mappable contaminant plumes. These AOIs will be further evaluated in Section 7.0. Table 4.7 lists the UHSU groundwater AOIs and identifies the areas where contiguous, mappable contaminant plumes occur.

4.6 References

Aziz, C.E., A.P. Smith, and C.J. Newell, 2000, BIOCHLOR Chlorinated Solvent Plume Database, Air Force Center for Environmental Excellence, Brooks AFB, San Antonio, TX, June, 73 pp.

Boss, M. R., 1973, Well Sampling at Rocky Flats, Including a Summary of Data Collected During 1972, Rocky Flats, Golden, Colorado, July 11.

DOE, 1993, Background Geochemical Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2005, Draft Final Interim Measure/Interim Remedial Action for Groundwater at the Rocky Flats Environmental Technology Site, Golden, Colorado, May 3.

EG&G, 1993a, Groundwater Protection and Monitoring Program Plan for Rocky Flats Plant, Golden, Colorado, October.

EG&G, 1993b, Background Geochemical Characterization Report, Rocky Flats Plant, Golden, Colorado, September.

EG&G, 1995a, Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site, Volume II of the Sitewide Geoscience Characterization Study, Golden, Colorado, Final Report, April.

EG&G, 1995b, Groundwater Geochemistry Report for the Rocky Flats Environmental Technology Site, Volume III of the Sitewide Geoscience Characterization Study, Golden, Colorado, Final Report, January.

Hurr, R. T., 1976, Hydrology of a Nuclear-processing Plant Site, Rocky Flats, Jefferson County, Colorado, U.S. Geological Survey Open-File Report 76-268.

K-H, 2002, Site-Wide Water Balance Model Report for the Rocky Flats Environmental Technology Site, Golden, Colorado.

K-H, 2004, Evaluation of Natural Attenuation and Biodegradation Potential of Chlorinated Aliphatic Hydrocarbon Compounds in Groundwater at Rocky Flats, Golden, Colorado, March.

K-H, 2005, Review of Historical Knowledge Related to Metals and Selected Radionuclides Identified As Environmental Media Analytes of Interest, Rocky Flats Environmental Technology Site, Golden, Colorado, July 15.

Pankow, J.F. and J.A. Cherry, 1996, *Dense Chlorinated Solvents and Other DNAPLs in Groundwater - History, Behavior, and Remediation*, Waterloo Press, Portland, Oregon, 522 pp.

RMRS, 1996, Final White Paper Analysis of Vertical Contaminant Migration Potential, Prepared for U.S. Department of Energy, RF/ER-96-0040.UN, August 16.

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Santschi, P.H. and K. Roberts, 2002, Draft Final Report on Phase Speciation of Pu and Am for Actinide Migration Studies at the Rocky Flats Environmental Technology Site, Texas A&M University at Galveston, August 21.

USEPA, 2005, USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Draft Final, OSWER 9240.1-46, EPA-540-R-04-009, January.

USEPA, 2001, USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, Final, OSWER 9240.1-34, EPA-540-R-00-006, June.

USEPA, 1999, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, EPA-540-R-99-008, October.

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Table 4.1

Summary of RFETS Well Installations and Sampling Frequencies

Calendar Year	Approximate Number of Wells Installed	Rationale for Area Investigated	Laboratory Analyses	Sampling Frequency	Approximate Cumulative Number of Wells to Date[a]
1960[b]-1985	56	Mainly SEP; also East Trenches, Woman Creek, B-ponds, and 903 Pad; since 1976 Present Landfill area; since 1982 West Spray Field	Radionuclides only (Pu/Am, U isotopes, and tritium) 1960 through 1984 (except for 1974 when fluoride, nitrate, TDS, and total alpha and beta were also analyzed); VOCs, phenols, trace metals, major cations and anions, TDS, TOC, and nitrate sampling began in 1985	Annually 1960-1973 Semiannually 1974-1979 Three times/year 1980-1981 Quarterly 1982-1985	56
1986	69	Provide more detailed characterization of site hydrogeology and water quality	Metals (hazardous substance list (HSL) and Cs, Mo, and Sr), major anions, VOCs (HSL), SVOCs (HSL), pesticides/PCBs, radionuclides (gross alpha and beta, U-isotopes, Pu/Am, and tritium)	Intended quarterly; only 1 set collected during 1986 because new well construction not completed until 4th quarter	125
1987	68	Characterize SWMUs and RCRA-regulated units	Same as 1986, except no SVOCs or pesticides/PCBs	Quarterly	193
1988	10	For water level measurements only; along utility lines	Same as 1986, except no SVOCs or pesticides/PCBs	Quarterly	203
1989	162	Characterize upgradient and site groundwater quality and flow; also SEP, Present Landfill, West Spray Field, OPWL, East Trenches, 881 Hillside, and 903 Pad	VOCs (TCL), metals (TAL), major anions, nitrate, radionuclides (gross alpha and beta, tritium, U-isotopes, Pu/Am, strontium, radium, and cesium), TDS, cyanide, DO, O&G	Quarterly	365
1990	18	North and south BZ (to site potential new landfill); 881 Hillside investigation	Same as 1989, except no O&G	Quarterly	383
1991	87	Mainly Mound, East Trenches, and 881 Hillside; also east BZ	Same as 1989, except no O&G	Quarterly	470
1992	30	881 Hillside, Woman Creek, and Walnut Creek	Same as 1989, except no O&G	Quarterly	500

Table 4.1

Summary of RFETS Well Installations and Sampling Frequencies

Calendar Year	Approximate Number of Wells Installed	Rationale for Area Investigated	Laboratory Analyses	Sampling Frequency	Approximate Cumulative Number of Wells to Date[a]
1993	152	SEP, Present Landfill, Woman Creek, and Walnut Creek	Same as 1989, except no O&G; DO discontinued during 1993	Quarterly	652
1994	85	West Spray Field, Present Landfill, Woman Creek IHSSs, and Indiana Street; also for water level measurements in dams and for site gas station	Same as 1989, except no O&G or DO	Generally quarterly for most site areas; information is vague	737
1995	180	Surface water seeps and SEP; many for general site potentiometric characterization	Same as 1989, except no O&G or DO	Generally quarterly for RCRA wells; semiannually for other wells	917
1996	15	IA characterization, new landfill	Same as 1989, except no O&G or DO	Generally quarterly for RCRA wells; semiannually for other wells	932
1997-2004	320	Characterization for areas adjacent to Mound, East Trenches, and SEP groundwater treatment systems and source removal accelerated actions; PU&D Yard, IHSS 118.1, IA Plume, 903 Pad/Ryan's Pit Plume, Oil Burn Pits #1 and #2, Original Landfill, Ash Pits, D&D Monitoring, and Actinide Migration Evaluation	With the implementation of the IMP, sampling became much more focused and dynamic based on project needs; main analytes included VOCs, nitrate, Pu/Am, uranium isotopes, metals, and TDS, with special analyses if warranted based on process knowledge or special DQOs (for example, biodegradation indicators, major ions, SVOCs, cyanide, and special radionuclides)	Quarterly for RCRA wells; semiannually for most other IMP wells	1,252[c]

[a] Does not take into account wells that have been abandoned and is not indicative of the number of wells sampled each year.

[b] There may have been three wells installed in 1954 in the area downgradient of the SEP; the analytes and sampling frequency of these wells are unknown.

[c] The total number of wells installed at RFETS varies with the sources researched.

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
0181	1981			2090201	753293	5718.90	5721.03					UHSU?		Bedrock?	01-81
0671	1971			2084747	751515	5906.00	5908.79			63.7		UHSU?		Bedrock?	Jun-71
0366	1966			2086264	750813	5957.10		30.0	153.0	144.9		UHSU/LHSU		Alluvium/Bedrock?	03-66
00100	2000	08/23/00	02/02/05	2084439	750668	5977.88	5977.47	7.0	31.7	31.6	10.5	UHSU	Qrf/Kclystn,sltstn,ss	Alluvium/Bedrock	
00191	1991	02/14/92		2086244	749237	5968.86	5970.44	15.0	25.0	27.0	24.2	UHSU	Qrf	Alluvium	
00193	1993			2088288	747794	5765.70	5767.84	10.0	20.0	22.2	8.8	UHSU		Bedrock	
00197	1997			2082562	747517	5927.00	5927.50	4.5	9.4	9.4	5.2	UHSU		Alluvium/Bedrock	
00200	2000	10/16/00	11/04/04	2084020	750097	5987.22	5986.79	4.0	19.9	20.0	7.1	UHSU	Qrf/Ksltstn,clystn	Alluvium/Bedrock	
00203	2003	10/21/03		2084946	750267	5972.88	5974.38	5.3	26.5	26.6	6.4	UHSU	Qrf/Kclstn,sltyclstn	Alluvium/Bedrock	
00291	1991	02/10/92	04/12/04	2086623	749197	5966.17	5967.57	44.0	54.0	56.0	16.0	UHSU	Kclss & Ksclst	Bedrock	
00293	1993		05/26/05	2079458	750313	6050.20	6052.44	38.0	48.0	50.0	48.2	UHSU	Qp	Alluvium	
00297	1997		04/05/04	2084965	750266	5973.00	5974.92	3.3	8.3	10.3	6.4	UHSU		Alluvium/Bedrock	
00298	1998	03/25/98	05/10/04	2085821	748030	5884.00	5884.98	7.5	12.3	12.5	2.6	UHSU		Bedrock	
00300	2000	10/19/00	11/04/04	2084025	749785	5986.27	5985.66	2.3	20.2	20.3	2.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
00391	1991	10/15/91	04/19/04	2086805	748886	5920.84	5922.40	16.8	21.8	23.8	16.9	UHSU	Ksclst & Kcss	Alluvium/Bedrock	
00393	1993			2083768	753173	5969.80	5971.67	4.0	14.0	16.0	13.2	UHSU	Qrf	Alluvium	
00397	1997		04/27/04	2083520	751603	5937.00	5938.03	4.0	9.0	11.0	1.0	UHSU		Bedrock	
00400	2000	09/07/00	01/19/05	2083966	750370	5988.08	5987.47	5.4	19.9	20.0	8.0	UHSU	Qrf/Kclystn,sltstn,ss	Alluvium/Bedrock	
00491	1991	10/11/91		2086807	748645	5903.47	5904.97	7.5	17.5	19.5	10.9	UHSU	Ksclst	Alluvium/Bedrock	
00500	2000	09/12/00	02/10/05	2084210	750693	5982.30	5981.89	5.3	20.1	20.2	13.0	UHSU	Qrf/Kss,sltstn,clystn	Alluvium/Bedrock	
00597	1997		04/20/04	2083307	752145	5983.00	5984.53	5.9	20.9	22.9	16.9	UHSU		Alluvium/Bedrock	
00600	2000	09/11/00		2084001	750719	5984.52	5983.92	5.3	19.9	20.0	6.4	UHSU	Qrf/Kclystn,ss,sltstn	Alluvium/Bedrock	
00691	1991	04/14/92		2086379	748322	5894.47	5896.13	5.3	12.3	14.3		UHSU	Qls	Alluvium	
00700	2000	09/06/00	02/03/05	2083744	750642	5985.02	5984.54	6.0	30.9	31.0	9.7	UHSU	Qrf/Kclystn,sltstn,ss	Alluvium/Bedrock	
00797	1997			2083999	747794	5939.00	5941.00	16.8	26.8	28.8		UHSU		Alluvium	
00798	1998	03/26/98	05/11/04	2086104	748094	5876.30	5877.13	9.1	13.9	14.1	5.0	UHSU		Bedrock	
00897	1997			2086154	749713	5966.00	5967.60	13.5	28.5	30.5	11.3	UHSU		Bedrock	
00997	1997			2088788	751503	5800.00	5801.90	5.4	10.4	12.4	10.5	UHSU		Alluvium	
01097	1997		08/23/04	2081313	751331	6027.00	6029.00	19.8	39.8	42.5	49.4	UHSU		Alluvium	
01197	1997		08/10/04	2081913	751354	6013.00	6015.28	13.0	28.0	30.0	28.0	UHSU		Alluvium	
01291	1991	02/20/92	06/14/05	2087062	748335	5851.21	5852.85	5.3	13.3	15.3	12.9	UHSU	Qls	Alluvium	
01297	1997		05/07/04	2081662	751705	6014.00	6016.10	14.0	34.0	36.0	34.1	UHSU		Alluvium	
01298	1998	04/08/98	05/11/04	2086553	748159	5853.80	5854.82	13.3	18.1	18.3	16.3	UHSU		Alluvium/Bedrock	
01391	1991	01/06/92	02/17/05	2085226	749402	5973.70	5975.30	6.0	14.0	16.0	14.5	UHSU	Qrf	Alluvium	
01397	1997		08/10/04	2082091	751680	6005.00	6006.94	7.2	22.2	24.2	20.9	UHSU		Alluvium/Bedrock	
01491	1991	12/04/91	08/11/04	2085474	749430	5970.37	5972.03	14.0	24.0	26.0	1.6	UHSU	Kss & Kcs	Bedrock	
01497	1997		04/07/05	2082281	751917	6002.00	6003.90	13.0	23.1	25.0	22.5	UHSU		Alluvium	
01597	1997		05/04/04	2082089	752170	6004.00	6006.36	14.6	29.6	31.6	28.5	UHSU		Alluvium	
0160	1960			2085432	751514	5905.90	5908.11			25.6		UHSU		Bedrock?	01-60

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
0166	1966			2080548	748964	6054.50	6056.11	30.0	152.0	151.6		UHSU		Bedrock?	01-66
01697	1997		04/06/05	2082678	751609	5998.00	5998.96	18.5	28.2	28.4	28.0	UHSU		Alluvium	
01698	1998	04/21/98	09/16/04	2086800	748192	5851.80	5852.96	11.2	16.0	16.2	15.3	UHSU		Alluvium/Bedrock	
0171	1971			2086327	748803	5950.00	5950.83	20.0	30.0	29.2		UHSU		Bedrock?	Jan-71
0174	1974			2086195	749626	5968.00	5968.83	11.0	24.0	24.2	11.0	UHSU		Bedrock	01-74
01791	1991	01/06/92	05/26/04	2086018	749504	5965.78	5967.41	10.0	18.0	20.0	8.0	UHSU	Ksltss & Ksclst	Bedrock	
01797	1997		08/10/04	2082780	751768	5995.00	5997.00	12.0	22.0	24.0	22.0	UHSU		Alluvium	
0182	1982			2085117	748039	5910.70	5912.79			18.5		UHSU		Bedrock?	01-82
0186	1986		04/19/05	2093973	744906	5627.67	5629.32	3.2	10.2	10.2	9.3	UHSU	Qp	Alluvium	01-86
0187	1987		06/09/04	2083653	748127	5992.49	5994.08	3.4	11.8	12.1	11.8	UHSU	af	Alluvium	01-87
01891	1991	11/13/91		2086023	749438	5971.76	5973.37	20.0	30.0	32.0	12.4	UHSU	Ksltss & Ksltclst	Bedrock	
01897	1997		08/10/04	2082979	751881	5990.00	5990.50	13.0	22.8	23.0	23.2	UHSU		Alluvium	
0190	1990		08/02/04	2080307	751087	6044.30	6045.88	29.5	44.5	49.5	62.5	UHSU	Qrf	Alluvium	TH 10W
01991	1991	03/26/92	04/27/04	2086734	749476	5962.19	5963.61	28.8	38.8	40.8	29.4	UHSU	Ksclst & Ksltclst	Alluvium/Bedrock	
01997	1997		08/10/04	2083273	751885	5984.00	5985.90	7.0	12.0	14.0	12.0	UHSU		Alluvium	
01998	1998	04/23/98	09/16/04	2086930	748212	5838.00	5838.98	2.5	4.3	4.5	2.4	UHSU		Bedrock	
02091	1991	01/06/92	03/17/05	2086428	749617	5965.19	5966.65	15.6	30.6	32.6	16.1	UHSU	Ksclst, Ksslt, Ksltclst	Alluvium/Bedrock	
02097	1997		05/05/04	2083813	752088	5975.00	5975.33	7.0	11.9	12.1	11.7	UHSU		Alluvium	
02098	1998	04/22/98	09/16/04	2086996	748218	5832.50	5833.30	2.9	4.7	4.9	3.0	UHSU		Bedrock	
02197	1997		08/10/04	2084837	752304	5959.00	5960.70	5.9	10.9	12.9	10.9	UHSU		Alluvium	
02291	1991	01/07/92	08/30/04	2086139	749880	5936.66	5938.26	11.5	16.5	18.5	8.8	UHSU	Ksclst & Kcss	Bedrock	
02297	1997			2084530	750491	5978.00	5978.65	7.1	12.0	12.2	11.3	UHSU		Alluvium	
02298	1998	04/10/98	09/16/04	2087147	748238	5833.90	5834.94	3.3	8.1	8.3	4.6	UHSU		Alluvium/Bedrock	
02391	1991	01/07/92		2086600	749853	5956.82	5958.43	3.0	6.0	8.0	6.9	UHSU	Qrf	Alluvium	
02397	1997		01/19/05	2084173	750386	5986.00	5986.81	6.1	11.0	11.1	10.2	UHSU		Alluvium	
02491	1991	11/06/91	03/17/05	2086432	749949	5944.54	5946.21	11.8	16.8	18.8	8.5	UHSU	Ksltss, Ksslt	Bedrock	
02497	1997		02/02/05	2084376	750716	5979.00	5979.42	6.0	11.0	11.1	10.2	UHSU		Alluvium	
02500	2000	08/16/00	01/19/05	2084531	750490	5978.00	5977.55	4.9	14.8	14.9	10.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
0254	1954			2084736	750053	5967.94				26.2		UHSU		Bedrock	
02591	1991	03/13/92	03/12/03	2089163	750937	5923.57	5925.34	42.1	49.1	51.1	39.8	UHSU	Kcss & Ksclst	Bedrock	
0260	1960			2085023	751181	5934.60	5935.06			22.6		UHSU		Bedrock?	02-60
02691	1991	01/07/92	08/11/04	2086043	750385	5934.78	5936.38	6.0	16.0	18.0	1.1	UHSU	Ksltss & Ksltclst	Bedrock	
02697	1997		06/21/05	2088991	750555	5916.00	5917.90	16.1	26.1	28.4	24.8	UHSU		Alluvium	
0271	1971			2085950	748513	5936.20	5936.79	20.0	30.0	28.6		UHSU		Bedrock?	Feb-71
02797	1997		05/25/05	2089129	750427	5929.00	5931.52	31.3	41.4	43.6	39.3	UHSU		Alluvium/Bedrock	
0281	1981			2089849	753678	5722.90	5724.77			7.1		UHSU		Bedrock?	02-81
0286	1986			2093925	748797	5725.01	5726.10	3.2	9.0	9.0	7.8	UHSU	Qc	Alluvium	02-86
0287	1987			2083934	747708	5930.99	5932.53	3.2	9.1	9.3	7.2	UHSU	Qls	Alluvium	02-87, BH3-87
02891	1991	01/07/92	08/12/04	2087098	749888	5953.09	5954.61	6.0	9.0	11.0	9.1	UHSU	Qrf	Alluvium	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
02897	1997		05/25/05	2089264	750495	5928.00	5929.75	21.7	36.8	39.0	37.3	UHSU		Alluvium	
0290	1990		09/30/04	2079308	752245	6048.30	6050.65	42.5	57.5	62.5	63.5	UHSU	Qrf	Alluvium	TH 2W
02991	1991	01/07/92	08/31/04	2086970	749777	5956.30	5957.90	42.0	52.0	54.0	15.8	UHSU	Kcss & Kscls	Bedrock	
03091	1991	01/07/92	08/31/04	2087160	749833	5952.88	5954.23	35.0	50.0	52.0	17.3	UHSU	Kslss, Kss & Kscls	Bedrock	
03191	1991	11/07/91	08/31/04	2087441	749882	5950.35	5952.02	11.2	21.2	23.2	21.1	UHSU	Qrf	Alluvium	
03198	1998	02/12/98	05/05/03	2085746	750003	5929.00	5929.50	7.0	12.0	12.0	7.8	UHSU		Alluvium/Bedrock	
03298	1998	02/13/98	06/26/03	2085766	750260	5948.00	5948.50	20.0	25.0	25.0	23.0	UHSU		Alluvium/Bedrock	
03391	1991	01/07/92	08/11/04	2086994	750047	5944.54	5946.22	29.9	39.9	41.9	10.8	UHSU	Kss, Kslss & Kscls	Bedrock	
03398	1998	02/17/98	05/05/03	2086079	750275	5927.00	5927.50	14.0	19.0	19.0	16.5	UHSU		Alluvium/Bedrock	
03498	1998	02/18/98	07/01/03	2084731	751742	5894.00	5894.50	11.0	16.0	16.0	13.0	UHSU		Alluvium/Bedrock	
03591	1991	01/07/92	08/30/04	2087691	749999	5949.02	5950.80	20.1	30.1	32.1	30.1	UHSU	Qrf	Alluvium	
03598	1998		05/27/03	2089073	751076	5877.90	5878.81	4.0	13.8	14.0	4.0	UHSU		Bedrock	
0360	1960			2085491	750889	5957.20	5957.37			20.2		UHSU		Bedrock?	03-60
03691	1991	03/25/92	08/11/04	2087072	750199	5932.55	5934.43	30.0	40.0	42.0	7.5	UHSU	Kss & Kcss	Bedrock	
03698	1998		05/27/03	2089060	751036	5879.80	5880.76	5.0	14.8	15.0	4.6	UHSU		Bedrock	
0371	1971			2087035	752022	5819.10		20.0	30.0	30.7		UHSU		Bedrock?	Mar-71
0374	1974			2087000	749931	5950.20	5951.36	9.0	24.0	24.0	6.8	UHSU		Bedrock	03-74
03791	1991	01/07/92	06/21/05	2087183	750206	5936.80	5938.24	38.0	48.0	50.0	4.9	UHSU	Kss, Kscls & Kslss	Bedrock	
0381	1981			2088580	751270	5808.40	5810.96			20.1		UHSU		Bedrock?	03-81
0382	1982			2080554	750009	6047.90	6049.56			18.5		UHSU	Qrf	Alluvium?	03-82
0386	1986		04/26/05	2093778	750543	5676.24	5677.86	10.4	23.7	23.7	8.0	UHSU	Kss	Bedrock	03-86
0390	1990		09/30/04	2078292	751328	6075.40	6079.13	50.0	65.0	70.0	92.0	UHSU	Qrf	Alluvium	TH 1W
03991	1991	03/23/92		2088449	750401	5935.17	5936.87	27.4	37.4	39.4	36.0	UHSU	Qrf	Alluvium	
03998	1998	04/23/98	05/11/04	2085763	748071	5888.40	5889.43	3.0	7.8	8.0	8.0	UHSU		Alluvium	
04091	1991	03/20/92		2088690	750730	5928.52	5930.14	28.0	36.0	38.0	36.0	UHSU	Qrf	Alluvium	
04098	1998	04/27/98	05/11/04	2085953	748112	5890.60	5891.53	2.9	7.7	7.9	6.0	UHSU		Alluvium/Bedrock	
04191	1991	02/05/92	04/06/05	2087330	749430	5955.58	5956.99	7.1	17.1	19.1	17.1	UHSU	Qrf	Alluvium	
04291	1991	01/29/92	04/13/04	2087654	749475	5952.50	5953.90	18.1	23.1	25.1	17.0	UHSU	Kscls	Bedrock	
04491	1991	01/16/92	04/13/04	2087888	749363	5949.51	5951.15	17.0	27.0	29.0	27.0	UHSU	Qrf	Alluvium	
04591	1991	11/01/91	04/05/05	2088034	749286	5948.69	5950.25	34.1	44.1	46.1	44.2	UHSU	Qrf	Alluvium	
0460	1960			2085531	750574	5962.00	5962.10			17.7		UHSU		Bedrock?	04-60
04691	1991	09/25/91	04/13/04	2088316	749342	5944.70	5946.43	33.9	43.9	45.9	43.9	UHSU	Qrf	Alluvium	
0471	1971			2086138	747861	5818.60		20.0	30.0	22.3		UHSU		Bedrock?	Apr-71
0486	1986			2093851	753482	5643.86	5644.91	3.5	14.9	14.9	14.0	UHSU	Qp	Alluvium	04-86
0487	1987			2084887	747943	5910.12	5911.58	3.5	19.5	19.7	19.7	UHSU	Qls	Alluvium	04-87
04891	1991	11/01/91	06/04/03	2088680	749439	5939.20	5940.76	29.7	39.7	39.7	39.7	UHSU	Qrf	Alluvium	
04991	1991	11/01/91	04/06/05	2088844	749551	5936.94	5938.63	30.3	40.3	42.3	40.2	UHSU	Qrf	Alluvium	
05091	1991	09/18/91	04/05/05	2088825	749894	5937.63	5939.24	34.0	44.0	46.0	43.5	UHSU	Qrf	Alluvium	
05093	1993		09/12/02	2085231	750804	5963.30	5965.54	3.5	10.5	12.5	9.7	UHSU	Qrf	Alluvium	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
05191	1991	11/01/91	04/06/05	2088672	749957	5938.40	5939.85	36.0	46.0	48.0	44.8	UHSU	Qrf	Alluvium	
05193	1993		09/12/02	2085225	750484	5968.40	5970.58	4.4	11.4	13.4	12.1	UHSU	Qrf	Alluvium	
05293	1993		06/27/05	2084490	750198	5980.70	5983.11	2.7	7.7	9.7	6.6	UHSU	Qrf	Alluvium	
05391	1991	11/01/91	08/30/04	2088298	750153	5940.19	5941.67	25.1	35.1	37.1	34.9	UHSU	Qrf	Alluvium	
05393	1993		09/12/02	2085223	750549	5967.40	5969.69	12.1	22.1	24.1	6.2	UHSU	Kscist & Kssist	Bedrock	
0560	1960			2085404	750308	5966.40	5966.71			19.4		UHSU		Bedrock?	05-60
05691	1991	11/01/91		2087621	750053	5947.61	5948.99	25.1	35.1	37.1	35.2	UHSU	Qrf	Alluvium	
05697	1997		08/06/04	2083844	750712	5986.35	5986.15	13.7	18.8	18.9	18.8	UHSU		Alluvium	
0571	1971			2088454	751262	5830.30		20.0	30.0	27.5		UHSU		Bedrock?	May-71
0581	1981			2082159	747573	5945.30	5947.06			33.0		UHSU		Bedrock?	05-81
0582	1982			2078145	749472	6096.10	6097.68			29.4		UHSU	Qrf	Alluvium?	05-82
0586	1986		06/02/03	2089776	753703	5724.38	5726.37	4.4	9.8	9.8	9.0	UHSU	Qp	Alluvium	05-86
0587	1987			2084849	748081	5927.85	5929.99	42.0	51.3	51.5	11.0	UHSU	Kss & Kssltss	Bedrock	0587BR, 05-87BR
0590	1990		07/23/02	2079248	745484	6096.80	6099.77	11.0	26.0	31.5	50.0	UHSU	Qrf	Alluvium	TH 21W
06091	1991	11/01/91	05/25/05	2088963	750405	5930.08	5931.60	30.7	40.7	42.7	39.1	UHSU	Qls	Alluvium/Bedrock	
06191	1991	01/03/92	08/30/04	2089985	750865	5919.21	5920.72	22.1	32.1	34.1	32.0	UHSU	Qls	Alluvium	
06291	1991	09/05/91	10/28/04	2091094	751639	5897.90	5899.28	27.9	32.9	34.9	23.3	UHSU	Kclst	Bedrock	
06391	1991	11/01/91	06/04/03	2091071	751197	5903.63	5905.17	17.6	22.6	24.6	21.2	UHSU	Qls	Alluvium	
06491	1991	08/28/91	04/18/05	2093867	751193	5671.45	5673.25	10.9	15.9	17.9	2.2	UHSU	Ksltss & Kscist	Bedrock	
06591	1991	03/02/92	08/01/02	2085535	749064	5978.28	5979.78	33.0	48.0	50.0	15.4	UHSU	Kscist & Ksltclst	Bedrock	
06691	1991	02/26/92	08/01/02	2085714	749068	5978.34	5979.94	13.1	23.1	25.1	22.0	UHSU	Qrf	Alluvium	
06791	1991	02/20/92	08/01/02	2085646	748855	5978.87	5980.38	11.2	21.2	23.2	21.2	UHSU	Qrf	Alluvium	
0681	1981			2082503	750859	6004.40	6005.75			17.6		UHSU		Bedrock?	06-81
0682	1982			2078147	749420	6097.40	6098.58			17.8		UHSU	Qrf	Alluvium?	06-82
0686	1986			2086654	753569	5814.68	5816.72	3.3	8.9	8.9	10.5	UHSU	Qp	Alluvium	06-86
0687	1987			2085134	748003	5904.76	5906.32	3.6	6.9	7.1	6.5	UHSU	Qls	Alluvium	06-87
06891	1991	03/02/92	08/01/02	2085883	749258	5974.14	5975.62	6.0	14.0	16.0	14.0	UHSU	Qrf	Alluvium	
0690	1990		07/23/02	2080143	745239	6083.70	6086.91	7.0	22.0	27.3	41.3	UHSU	Qrf	Alluvium	TH 27W
06991	1991	02/27/92	08/01/02	2085990	749168	5972.91	5974.57	14.0	29.0	31.0	28.6	UHSU	Qrf	Alluvium	
07191	1991	03/16/92	08/01/02	2085908	748850	5974.79	5976.34	11.1	21.1	23.1	20.0	UHSU	Qrf	Alluvium	
07291	1991	03/02/92	06/28/05	2085766	748748	5977.27	5978.80	10.6	20.6	22.6	20.0	UHSU	Qrf	Alluvium	
07391	1991	02/10/92		2085827	748547	5949.14	5950.61	5.4	11.4	13.4	8.1	UHSU	Qrf & Kclst	Alluvium/Bedrock	
0774	1974			2088198	749411	5946.50	5947.00	30.0	40.0	39.7	31.8	UHSU		Bedrock	07-74
0781	1981			2082539	750860	6004.10	6006.06			15.7		UHSU		Bedrock?	07-81
0782	1982			2076117	748821	6143.30	6145.84			58.8		UHSU	Qrf	Alluvium?	07-82
0786	1986			2083977	752827	5924.94	5926.54	3.0	5.7	5.7	5.0	UHSU	Qls	Alluvium	07-86
07891	1991	12/13/91	08/30/04	2087041	749653	5957.78	5959.45	18.0	28.0	30.0	27.5	UHSU	Qrf	Alluvium	
0790	1990		07/23/02	2079640	744708	6095.90	6098.79	33.0	48.0	53.3	48.8	UHSU	Qrf	Alluvium	TH 24W
07991	1991	02/03/92	04/05/05	2087443	749541	5954.91	5956.78	16.1	26.1	28.1	26.0	UHSU	Qrf	Alluvium	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
08091	1991	01/28/92	04/13/04	2087795	749671	5947.90	5949.51	11.3	16.3	18.3	16.1	UHSU	Qrf	Alluvium	
08391	1991	01/21/92	04/13/04	2088034	749607	5947.20	5948.65	28.0	38.0	40.0	37.2	UHSU	Qrf	Alluvium	
08591	1991	01/16/92	04/13/04	2088006	749526	5948.57	5950.12	32.0	42.0	44.0	40.7	UHSU	Qrf	Alluvium	
0881	1981			2079681	749972	6064.50	6065.92			20.0		UHSU		Bedrock?	08-81
08891	1991	03/05/92	08/01/02	2085866	749128	5976.36	5978.06	15.3	25.3	27.3	23.0	UHSU	Qrf	Alluvium	
09091	1991	03/03/92	08/01/02	2085943	748918	5975.16	5976.79	14.7	24.7	26.7	24.0	UHSU	Qrf	Alluvium	
09691	1991	02/27/90	06/27/05	2086038	748572	5935.64	5937.05	6.0	14.0	16.0	3.1	UHSU	Kslss & Kclst	Bedrock	
0974	1974			2084783	748028	5925.10	5926.39	10.0	19.5	19.0	11.0	UHSU		Bedrock	09-74
0981	1981			2079740	749969	6063.50	6065.16			14.1		UHSU	Qrf	Alluvium?	09-81
0987	1987		05/26/04	2085348	749068	5980.22	5981.70	14.5	32.2	32.4	12.5	UHSU	Kss	Bedrock	09-87, BH29-87
10092	1992		09/27/04	2085296	747942	5898.42	5900.47	5.2	18.8	20.6	18.6	UHSU	Qls	Alluvium	FD01A
10094	1994		07/23/03	2091932	743067	5644.00	5646.20	4.1	6.1	8.4	6.7	UHSU		Alluvium	
10098	1998	07/31/98	01/20/05	2081604	749166	6036.00	6035.50	3.8	8.7	8.8		UHSU		Alluvium	
10192	1992		09/16/04	2084096	747687	5922.66	5924.30	4.9	16.8	18.7	16.4	UHSU	Qls	Alluvium	FD02A
10194	1994		04/06/05	2088284	749121	5938.30	5940.38	30.8	40.8	43.0	40.7	UHSU		Alluvium	
10197	1997		02/01/05	2085993	750112	5925.40	5925.90	12.5	16.5	16.5	13.7	UHSU		Alluvium/Bedrock	
10198	1998	08/14/98	12/08/04	2081609	749063	6036.00	6035.50	5.3	13.1	13.2		UHSU		Alluvium	
10292	1992		09/16/04	2084106	747692	5923.79	5925.46	18.0	22.7	24.3	15.2	UHSU	Ksltclst & Kcslst	Bedrock	FD02B
10294	1994		10/12/04	2093691	742319	5604.00	5606.20	4.6	14.6	17.0	14.4	UHSU		Alluvium	
10297	1997			2086018	750092	5927.50	5927.90	9.6	13.4	13.4	12.5	UHSU		Alluvium/Bedrock	
10298	1998	08/05/98	01/20/05	2081786	749248	6030.00	6029.40	5.8	15.6	15.7		UHSU		Alluvium	
10304	2004	07/01/04		2086512	747891	5814.34	5816.80	4.3	19.3	19.8	7.5	UHSU	Qc,Qvfa,Kscltyclystn,Kclystn	Alluvium/Bedrock	
10394	1994			2093664	744947	5630.00	5633.13	3.2	8.2	10.5	8.0	UHSU		Alluvium	
10397	1997			2086042	750117	5926.70	5927.20	18.6	22.6	22.6	21.2	UHSU		Alluvium/Bedrock	
10398	1998	08/13/98	01/20/05	2081802	749175	6031.00	6030.50	5.3	11.1	11.3		UHSU		Alluvium	
10492	1992		09/27/04	2083812	747678	5930.83	5932.81	25.9	30.3	31.9	22.6	UHSU	Kcss & Kscltclst	Bedrock	FD03B
10497	1997			2086092	750097	5918.40	5919.00	6.3	8.3	8.3	6.8	UHSU		Alluvium/Bedrock	
10498	1998	08/13/98	03/16/05	2081790	749070	6033.00	6032.50	6.1	11.9	12.1		UHSU		Alluvium	
10592	1992		09/27/04	2083725	747716	5936.14	5937.93	4.7	24.0	25.8	23.5	UHSU	Qls	Alluvium	FD04A
10594	1994			2086746	752124	5818.02	5820.95	4.5	7.9	10.5	7.9	UHSU		Alluvium	
10598	1998	08/13/98	12/02/04	2081749	749015	6034.00	6033.40	2.3	8.1	8.2		UHSU		Alluvium	
10692	1992		09/27/04	2083638	747745	5941.50	5943.60	5.0	19.4	21.3	18.9	UHSU	Qls	Alluvium	FD05A
10694	1994		06/09/05	2088757	752659	5757.29	5760.23	3.7	5.7	8.0	5.7	UHSU		Alluvium	
10697	1997			2086143	750116	5914.20	5914.80	8.0	12.0	12.0	10.0	UHSU		Alluvium/Bedrock	
1074	1974			2084705	747988	5925.80	5926.00	1.0	10.0	9.9		UHSU	af	Alluvium	10-74
10792	1992		11/09/04	2084363	747723	5915.02	5917.10	17.7	22.4	24.0	16.2	UHSU	Kslss	Bedrock	FD06B
10794	1994		06/08/05	2090860	753735	5695.85	5698.51	2.5	4.5	6.8	4.5	UHSU		Alluvium	
10797	1997			2086169	750140	5912.00	5912.80	13.5	15.5	15.5	15.0	UHSU		Alluvium	
1081	1981			2076105	748871	6142.60	6144.67			18.3		UHSU	Qrf	Alluvium?	10-81

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
1086	1986		04/07/05	2082491	752169	5996.62	5998.19	3.3	23.8	23.8	23.0	UHSU	Qrf	Alluvium	10-86
1087	1987		05/26/04	2085290	748946	5981.95	5983.52	3.5	12.0	12.0	11.3	UHSU	Qrf	Alluvium	10-87
10894	1994		06/08/05	2092348	753948	5666.75	5668.91	3.0	8.0	10.2	4.7	UHSU		Alluvium/Bedrock	
10897	1997			2086203	750124	5912.40	5913.00	2.2	8.2	8.2	6.2	UHSU		Alluvium/Bedrock	
10991	1991	03/08/89	02/21/03	2088679	749629	5940.01	5941.64	46.0	51.0	53.0	45.2	UHSU	Ksltss	Alluvium/Bedrock	
10992	1992			2084780	747775	5896.85	5898.56	4.9	29.4	31.3	29.2	UHSU	Qls	Alluvium	FD08A
10994	1994		07/28/05	2083266	747431	5915.41	5917.48	12.2	17.2	19.7	18.0	UHSU		Alluvium	
10997	1997			2086229	750149	5910.90	5911.30	7.4	11.4	11.4	4.0	UHSU		Alluvium/Bedrock	
11092	1992			2085079	747842	5893.33	5895.31	5.0	19.0	20.5	18.6	UHSU	Qls	Alluvium	FD09A
11094	1994		07/28/05	2082927	747260	5909.87	5912.37	2.4	6.8	9.8	6.5	UHSU		Alluvium	
11097	1997			2086261	750135	5912.70	5913.60	2.0	6.0	6.0	4.8	UHSU		Alluvium/Bedrock	
11104	2004	07/20/04		2082755	747538	5921.10	5923.90	4.4	19.4	19.5	5.9	UHSU	Qc,Qvfa,Kslty clystn,Kclystn	Alluvium/Bedrock	
11294	1994		09/30/04	2074305	749435	6171.40	6173.50	61.2	76.2	78.5	75.8	UHSU		Alluvium	
11397	1997			2086124	749960	5931.00	5931.40	9.2	13.2	13.2	8.0	UHSU		Bedrock	
11491	1991	11/01/91	08/26/04	2087628	750035	5948.22	5949.76	10.3	25.3	27.3		UHSU	Qrf	Alluvium	
11494	1994			2074267	748148	6184.58	6186.63	52.0	67.0	69.5	69.0	UHSU		Alluvium	
11502	2002	10/31/02		2082941	748199	6014.82	6014.41	17.0	47.0	49.3	19.0	UHSU	Kclstn,sltstn,sndysltstn,sltyss,	Bedrock	CB34-000, OLF#12
11602	2002	11/04/02	06/07/05	2083261	748201	6009.36	6009.07	17.4	47.4	49.7	8.0	UHSU	Ksndysltstn,sltstn,sltyss,ss	Bedrock	CC34-000, OLF#13
11691	1991	01/07/92	08/11/04	2087182	750188	5938.63	5939.91	18.5	33.5	35.5	9.5	UHSU	Kclss & Kss	Bedrock	
11694	1994		01/29/03	2085008	755770	5945.21	5947.66	7.5	27.5	29.5	27.3	UHSU		Alluvium	
11697	1997		06/01/04	2086437	750167	5924.50	5925.20	26.5	30.5	30.5	26.1	UHSU		Bedrock	
11791	1991	04/04/89	04/19/04	2086786	748900	5923.29	5925.03	8.7	13.7	15.7	6.9	UHSU	Kscist	Bedrock	
11794	1994		01/29/03	2085007	755760	5945.50	5948.06	7.5	27.5	29.5	27.3	UHSU		Alluvium	
11797	1997			2086225	750085	5919.00	5919.50	3.5	7.5	7.5	6.5	UHSU		Alluvium/Bedrock	
1186	1986			2090010	753331	5718.04	5720.09	3.9	10.3	10.3	9.5	UHSU	Qp	Alluvium	11-86
1187	1987		12/24/04	2086100	748409	5913.60	5915.12	15.2	20.3	20.5	5.2	UHSU	Kcss	Bedrock	11-87BR
1188	1988			2083683	748613	6004.08						UHSU		Alluvium	
11891	1991	01/07/92	06/21/05	2086999	750033	5945.51	5947.44	13.0	28.0	30.0	12.0	UHSU	Kssltt & Ksltss	Bedrock	
11897	1997		05/25/04	2086176	749946	5931.80	5932.40	6.9	10.7	10.7	6.3	UHSU		Bedrock	
12091	1991	01/06/92		2086009	749436	5971.59	5973.27	14.0	22.5	24.0	13.2	UHSU	Ksltss	Bedrock	
12094	1994		06/08/05	2088529	753880	5759.99	5763.07	5.6	10.0	12.0	7.4	UHSU		Alluvium	
12191	1991	01/07/92	08/31/04	2086949	749774	5956.49	5958.19	18.0	33.0	35.0	15.7	UHSU	Ksltss & Kss	Bedrock	
12291	1991	05/05/89	08/11/04	2085441	749429	5970.98	5972.73	7.1	14.1	16.1	2.0	UHSU	Kcss & Kss	Bedrock	
12391	1991	05/18/89	08/30/04	2088273	750176	5940.07	5941.70	58.4	68.4	70.4	36.5	UHSU	Kss, Ksltss & Kclss	Bedrock	
12491	1991	04/06/89	08/31/04	2087588	750058	5946.84	5948.35	45.0	60.0	62.0	30.0	UHSU	Kss & Kcss	Bedrock	
12691	1991	06/29/89	08/31/04	2087419	749952	5949.68	5951.08	48.1	63.1	65.1	20.0	UHSU	Kss	Bedrock	
1286	1986			2087879	752335	5785.88	5788.03	2.0	11.3	11.3	11.0	UHSU	Qp?	Alluvium	12-86
1287	1987		05/30/03	2086066	748581	5934.81	5936.30	4.9	10.0	10.3	3.5	UHSU	Kcslt	Bedrock	12-87BR
12991	1991	12/04/89	04/12/04	2086625	749209	5965.71	5967.22	19.5	34.5	36.5	16.1	UHSU	Kscist	Bedrock	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
13091	1991	06/05/89	08/01/02	2085992	748960	5973.68	5975.20	11.3	21.3	23.3	19.5	UHSU	Qrf	Alluvium	
13191	1991	06/06/89	08/01/02	2085530	749071	5978.25	5979.90	15.7	25.7	27.7	15.4	UHSU	Kscls	Alluvium/Bedrock	6591
13291	1991	05/05/89	08/01/02	2085523	749060	5978.48	5979.97	5.7	15.7	17.7	15.4	UHSU	Qrf	Alluvium	
13391	1991	06/23/89	08/26/04	2089164	750922	5923.83	5925.35	29.0	39.0	41.0	38.6	UHSU	Qrf	Alluvium	
13403	2003	10/27/03		2079644	747409	6028.59	6030.09	4.4	19.4	19.5	8.0	UHSU	Qc/Kclstn	Alluvium/Bedrock	
13491	1991	05/17/89	04/27/04	2086732	749489	5961.92	5963.42	19.0	29.0	29.5	29.4	UHSU	Qrf	Alluvium	
1374	1974			2080171	747113	5991.70	5993.01	5.0	20.0	19.2	5.5	UHSU		Bedrock	13-74
1386	1986		06/28/05	2086051	751857	5840.47	5842.59	3.1	9.5	9.5	9.0	UHSU	Qp	Alluvium	13-86
1390	1990		08/02/04	2080951	752848	6017.50	6020.62	24.0	39.0	44.3	47.5	UHSU	Qrf	Alluvium	TH 11W
1474	1974			2080091	747123	5993.30	5994.51	1.0	5.0	4.6		UHSU	Qls	Alluvium	14-74
1486	1986		12/04/03	2085838	751856	5844.71	5846.71	39.4	55.4	55.4	11.0	UHSU	Kss & Kscls	Bedrock	14-86
1487	1987		06/23/05	2086616	748228	5854.98	5856.56	19.0	24.1	24.3	5.2	UHSU	Kss & Kslt	Bedrock	1487BR, 14-87BR
1490	1990		08/02/04	2079028	750839	6068.90	6071.28	44.5	59.5	64.5	66.0	UHSU	Qrf	Alluvium	TH 8AW
15199	1999			2086300	750061	5926.00	5928.00	4.3	9.3	11.3	5.0	UHSU		Alluvium/Bedrock	
15399	1999			2086138	750060	5922.00	5924.00	4.3	7.3	9.3	7.2	UHSU		Alluvium	
15499	1999			2086089	750073	5922.00	5924.00	5.5	10.5	12.5	6.4	UHSU		Alluvium/Bedrock	
15599	1999			2086116	750116	5916.00	5917.90	4.0	7.0	9.0	3.4	UHSU		Bedrock	
15699	1999			2086149	750112	5917.00	5919.00	5.9	8.9	10.9	6.5	UHSU		Alluvium/Bedrock	
1574	1974			2088363	747672	5765.70	5766.41	5.0	20.0	19.3	5.5	UHSU		Bedrock	15-74
15799	1999			2086255	750096	5920.00	5922.00	5.4	8.4	10.4	5.4	UHSU		Bedrock	
1586	1986		05/30/03	2085812	751852	5848.43	5850.63	4.1	14.4	14.4	12.5	UHSU	Qp	Alluvium	15-86
1587	1987		08/01/02	2086249	749011	5971.27	5972.79	5.8	22.1	22.5	21.9	UHSU	Qrf	Alluvium	15-87, BH30-87
1686	1986		12/04/03	2085260	751747	5867.92	5869.55	39.1	45.1	45.1	7.0	UHSU	Kssltss	Bedrock	16-86
1774	1974			2088515	751170	5810.90	5811.99	6.0	16.0	14.3	7.5	UHSU		Bedrock	17-74
1786	1986			2085242	751740	5868.43	5869.57	3.7	14.0	14.0	12.5	UHSU	Qp	Alluvium	17-86
1787	1987			2086308	749415	5968.01	5969.56	3.5	25.5	25.8	25.0	UHSU	Qrf	Alluvium	17-87
18199	1999	02/03/99		2083821	750791	5988.16	5987.56	10.5	23.5	25.5	11.9	UHSU	Qrf/Kss	Alluvium/Bedrock	
18299	1999	01/27/99		2083872	750775	5987.70	5987.50	8.6	21.6	23.6	9.7	UHSU	Qrf/Kclystn,ss	Alluvium/Bedrock	
18399	1999	01/21/99		2083934	750778	5985.46	5984.86	5.4	13.4	16.0	11.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
18499	1999	02/22/99	08/06/04	2083853	750708	5986.35	5985.95	11.9	21.9	22.2	22.5	UHSU		Alluvium	
18599	1999	02/18/99	08/06/04	2083894	750719	5985.96	5985.56	11.6	21.7	22.0	21.4	UHSU		Alluvium	
18699	1999	02/17/99	08/12/04	2083931	750718	5985.63	5985.63	5.7	15.7	17.7	6.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
18799	1999	01/19/99	02/09/05	2083820	750665	5985.91	5985.41	5.9	10.9	12.9	9.0	UHSU	Qrf/Kss	Alluvium/Bedrock	
1886	1986		08/26/04	2085831	751522	5885.75	5887.97	3.7	7.5	7.5	8.0	UHSU	Qls	Alluvium	18-86
18899	1999	01/19/99	08/06/04	2083898	750671	5985.97	5985.57	6.0	9.0	11.0	7.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
1986	1986		02/15/05	2083296	750894	5943.08	5943.86	3.0	12.3	12.3	11.5	UHSU	Kclst	Alluvium	19-86
1987	1987		05/28/04	2086171	749623	5968.44	5969.91	3.5	11.7	11.9	10.8	UHSU	Qrf	Alluvium	19-87
20098	1998	06/25/98	01/13/05	2084239	751291	5933.00	5932.55	12.3	22.0	22.3	18.0	UHSU		Alluvium/Bedrock	
20191	1991	04/06/92	08/30/04	2087610	750061	5946.93	5948.49	37.0	57.0	59.0	33.1	UHSU	Kscls & Kcss	Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
20196	1996		08/02/04	2080002	752330	6039.00	6041.09	40.3	65.3	68.6	67.0	UHSU		Alluvium	
20197	1997		08/09/04	2083180	747581	5939.00	5939.61	2.3	6.6	6.8	2.4	UHSU		Alluvium/Bedrock	
20198	1998	07/01/98	01/13/05	2084145	751291	5935.00	5934.37	5.0	9.8	10.0	9.5	UHSU		Alluvium	
20205	2005	04/16/05		2084050	751285	5936.94	5939.59	5.8	20.8	21.0	11.5	UHSU	Qc,Qaf?,Kclystn	Alluvium/Bedrock	
20291	1991	04/10/92	08/23/04	2087612	750052	5947.19	5948.58	18.0	33.0	33.3	33.1	UHSU	Qrf	Alluvium	
20298	1998	07/02/98	01/13/05	2084051	751290	5936.00	5935.58	6.6	11.2	11.5	11.4	UHSU		Alluvium	
20397	1997		08/09/04	2083082	747597	5940.00	5940.64	2.1	6.6	6.8	2.0	UHSU		Bedrock	
20398	1998	07/07/98	01/13/05	2083953	751290	5938.00	5937.50	10.4	22.9	23.2	19.0	UHSU		Alluvium/Bedrock	
20491	1991	04/13/92	08/31/04	2087601	750051	5947.23	5948.71	16.6	31.6	32.9		UHSU	Qrf	Alluvium	
20498	1998	07/07/98	01/13/05	2083850	751290	5940.00	5939.47	12.4	22.0	22.3	21.0	UHSU		Alluvium/Bedrock	
20505	2005	04/15/05		2083762	751288	5939.64	5941.52	5.8	25.8	26.0	16.1	UHSU	Qaf,Qc,Kclystn,Kscltyclystn	Alluvium/Bedrock	
20591	1991	04/03/92	05/03/04	2086316	749405	5968.01	5969.61	4.1	24.1	24.6	24.5	UHSU	Qrf	Alluvium	
20597	1997		08/09/04	2082989	747634	5944.00	5944.50	5.5	10.2	10.4	4.5	UHSU		Bedrock	
20598	1998	07/13/98	01/13/05	2083762	751290	5941.00	5940.30	5.7	15.2	15.5	14.5	UHSU		Alluvium/Bedrock	
20691	1991	04/02/92	03/16/05	2086317	749411	5968.09	5969.63	4.5	24.5	25.0	24.5	UHSU	Qrf	Alluvium	
20697	1997		11/15/04	2082647	747718	5966.00	5966.80	5.0	9.8	10.0	8.9	UHSU		Alluvium/Bedrock	
20698	1998	07/14/98	01/13/05	2083663	751288	5943.00	5942.70	12.0	21.6	21.9	20.4	UHSU		Alluvium/Bedrock	
20705	2005	04/19/05		2083590	751284	5940.69	5943.25	6.8	31.8	32.0	26.4	UHSU	Qaf,Qc,Kclystn	Alluvium/Bedrock	
20791	1991	04/02/92	05/03/04	2086318	749416	5967.90	5969.49	29.5	34.5	36.5	24.5	UHSU	Kclst & Ksclst	Bedrock	
20797	1997		12/13/04	2082894	747669	5948.00	5948.52	3.6	8.6	8.8	8.6	UHSU		Alluvium	
20798	1998	07/16/98	01/13/05	2083590	751286	5944.00	5943.40	15.4	26.9	27.2	26.2	UHSU		Alluvium/Bedrock	
20891	1991	04/07/92	08/31/04	2087285	749977	5949.35	5952.02	21.7	63.7	64.0	19.4	UHSU	Ka	Bedrock	
20898	1998	07/17/98	10/25/04	2083546	751103	5946.00	5945.50	7.8	15.8	16.1	15.6	UHSU		Alluvium	
20902	2002	08/05/02		2083475	751000	5947.86	5949.86	5.8	15.8	18.0	4.0	UHSU	Kclystn	Bedrock	
20991	1991	04/03/92	06/21/05	2087287	749971	5949.78	5951.39	21.0	63.0	65.0	19.4	UHSU	Kcss, Kclst, Kss, Ksclst	Bedrock	
20998	1998	08/18/98	08/12/02	2083494	751002	5954.00	5954.90	5.9	10.6	10.9	10.3	UHSU		Alluvium	
21002	2002	07/31/02		2083458	750898	5959.27	5961.27	6.7	21.7	24.0	18.2	UHSU	Qc/Kclystn	Alluvium/Bedrock	
21091	1991	04/09/92	08/31/04	2087282	749997	5948.57	5950.12	19.0	63.0	65.0	15.0	UHSU	Kscltss, Kclss	Bedrock	
21097	1997		11/09/04	2082747	747710	5961.00	5961.98	3.1	8.0	8.1	0.2	UHSU		Bedrock	
21098	1998	07/20/98	08/12/02	2083446	750910	5958.00	5959.00	9.4	18.9	19.2	18.2	UHSU		Alluvium/Bedrock	
21191	1991	04/15/92	08/31/04	2087599	750060	5946.85	5948.52	35.8	57.8	58.0	31.7	UHSU	Kcss	Bedrock	
21197	1997		08/12/02	2082082	751163	5937.00	5937.47	2.4	7.3	10.4	0.6	UHSU		Bedrock	
21198	1998	07/22/98	10/24/04	2083385	750839	5957.00	5957.50	14.7	29.1	29.4	28.0	UHSU		Alluvium/Bedrock	
21297	1997		09/11/02	2082203	751201	5979.00	5979.35	1.0	5.9	6.0	0.3	UHSU		Bedrock	
21298	1998	08/19/98	03/09/05	2083327	750744	5959.00	5958.70	10.1	19.7	20.0	19.1	UHSU		Alluvium/Bedrock	
21397	1997		08/12/02	2082335	751246	5975.00	5975.30	1.0	5.8	6.0	0.7	UHSU		Bedrock	
21398	1998	08/25/98	04/06/05	2083250	750673	5966.00	5966.70	7.1	13.7	14.0	13.1	UHSU		Alluvium/Bedrock	
21497	1997		08/12/02	2082463	751290	5970.00	5970.40	2.5	7.4	7.6	0.4	UHSU		Bedrock	
21498	1998	08/24/98	06/01/05	2083182	750617	5965.00	5964.60	6.0	10.7	11.0	9.9	UHSU		Alluvium/Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
21597	1997		08/12/02	2082604	751337	5965.00	5965.67	0.3	5.1	5.3	0.3	UHSU		Bedrock	
21598	1998	08/26/98	06/01/05	2083138	750543	5969.00	5969.70	6.1	13.7	14.0	13.0	UHSU		Alluvium/Bedrock	
21697	1997		08/12/02	2082728	751382	5961.00	5961.54	0.0	8.7	8.8	0.2	UHSU		Bedrock	
21698	1998	03/27/98	03/09/05	2083067	750468	5973.00	5973.90	5.9	15.5	15.8	13.0	UHSU		Alluvium/Bedrock	
21797	1997		08/12/02	2082863	751425	5957.00	5957.40	0.9	5.8	10.0	0.1	UHSU		Bedrock	
21798	1998	09/01/98	06/01/05	2082921	750420	5982.00	5981.50	16.1	25.7	26.0	24.0	UHSU		Alluvium/Bedrock	
2186	1986		01/22/04	2082501	750855	6004.76	6005.96	35.0	67.2	67.3	15.0	UHSU	Kss & Kcltclst	Bedrock	21-86
2187	1987		01/31/05	2085799	749969	5928.43	5929.69	3.3	10.4	10.6	8.0	UHSU	Qc	Alluvium	21-87
21898	1998	09/08/98	06/01/05	2082882	750357	5989.00	5988.60	12.2	21.7	22.0	18.3	UHSU		Alluvium/Bedrock	
21997	1997		08/12/02	2083038	751487	5950.00	5950.50	2.5	7.4	7.5	0.2	UHSU		Bedrock	
21998	1998	09/01/98		2082788	750309	5995.00	5994.60	12.2	19.7	20.0		UHSU		Alluvium	
22097	1997		08/12/02	2083131	751517	5947.00	5947.50	1.9	6.9	7.0	0.4	UHSU		Bedrock	
22098	1998	09/03/98		2082681	750303	6000.00	5999.60	10.4	24.7	25.0	26.8	UHSU		Alluvium	
22197	1997		08/12/02	2083223	751548	5944.00	5944.50	1.0	6.3	6.5	0.5	UHSU		Bedrock	
22198	1998	09/10/98	01/13/05	2084334	751293	5932.00	5931.60	7.6	17.2	17.6	22.7	UHSU		Alluvium	
22205	2005	04/06/05		2084432	751288	5932.19	5934.45	4.8	19.8	20.0	12.8	UHSU	Qc,Qrf,Qaf?,Ksndyclysltstn,Kclystn	Alluvium/Bedrock	
22297	1997		08/12/02	2083411	751606	5940.00	5940.65	1.2	3.0	3.1	1.4	UHSU		Bedrock	
22298	1998	09/14/98	01/13/05	2084431	751292	5931.00	5930.60	6.5	16.1	16.4	16.6	UHSU		Alluvium	
22596	1996		08/10/04	2082750	750823	6008.00	6009.80	17.0	27.0	29.0	26.5	UHSU		Alluvium	
22597	1997			2086848	750196	5914.00	5914.55	14.3	26.0	26.2	0.8	UHSU		Bedrock	
22696	1996		04/27/04	2083516	750747	5980.00	5982.58	7.5	17.5	19.5	18.0	UHSU		Alluvium	
22697	1997			2086931	750243	5907.00	5907.51	6.2	17.9	18.0	1.9	UHSU		Bedrock	
22796	1996			2083740	751266	5942.00	5944.50	7.0	17.0	19.0	17.0	UHSU		Alluvium	
22797	1997			2087002	750291	5899.00	5899.50	6.8	13.6	13.8	8.0	UHSU		Alluvium/Bedrock	
2286	1986		04/28/04	2084411	750718	5978.77	5979.55	3.2	11.2	11.2	11.0	UHSU	Qrf	Alluvium	22-86
22896	1996		06/21/05	2083393	750369	5999.00	6001.42	13.3	23.3	26.2	23.5	UHSU		Alluvium	
22897	1997			2087089	750333	5897.00	5897.65	14.3	24.1	24.2	1.0	UHSU		Bedrock	
22996	1996			2084557	749188	5986.00	5988.50	3.5	8.5	11.5	9.0	UHSU		Alluvium	
22997	1997			2087172	750383	5891.00	5891.60	4.3	16.0	16.1	5.8	UHSU		Alluvium/Bedrock	
23096	1996			2086086	747836	5836.00	5837.80	4.0	14.0	16.0	14.0	UHSU		Alluvium	
23097	1997			2087260	750433	5887.00	5887.48	3.9	13.6	13.8	6.2	UHSU		Alluvium/Bedrock	
23196	1996		10/05/04	2087014	748060	5815.00	5816.67	15.0	25.0	27.5	27.0	UHSU		Alluvium	
23197	1997			2087350	750466	5885.00	5885.86	4.4	14.2	17.3	4.3	UHSU		Bedrock	
23296	1996			2087624	750683	5856.00	5858.00	3.0	8.0	10.3	7.5	UHSU		Alluvium	
23397	1997			2087531	750547	5879.00	5879.59	4.3	14.1	14.2	5.5	UHSU		Alluvium/Bedrock	
23597	1997			2087716	750612	5873.00	5873.34	9.4	19.2	19.4	1.6	UHSU		Bedrock	
2387	1987			2085910	749404	5972.79	5974.49	17.2	37.6	37.9	15.2	UHSU	Kscltss & Kclst	Bedrock	2387BR, 23-87BR
23897	1997			2088005	750710	5862.00	5862.35	11.3	18.1	18.3	12.5	UHSU		Alluvium/Bedrock	
23997	1997			2088105	750723	5861.00	5861.63	8.1	17.9	18.1	8.9	UHSU		Alluvium/Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
24193	1993			2086905	749808	5956.00		22.0	72.0	75.0	12.9	UHSU		Bedrock	SV1
24297	1997			2085373	750337	5897.00	5897.72	4.2	9.1	9.2	1.0	UHSU		Bedrock	
24393	1993			2086907	749789	5957.00		22.0	72.0	75.0	15.1	UHSU		Bedrock	SI1
24397	1997			2086681	750099	5925.00	5925.61	13.4	18.3	18.5	4.3	UHSU		Bedrock	
24497	1997			2086765	750148	5917.00	5917.60	7.2	16.9	17.1	5.2	UHSU		Bedrock	
2486	1986			2084277	750338	5982.45	5983.56	3.0	7.5	7.5	7.2	UHSU	Qrf	Alluvium	24-86
2487	1987		08/10/04	2086746	749751	5958.29	5959.69	3.5	13.6	13.9	15.1	UHSU	Qrf	Alluvium	24-87
24993	1993			2086910	749809	5956.00		23.0	68.0	76.0	14.3	UHSU		Bedrock	SPM1
25093	1993			2086912	749787	5957.00		23.0	68.0	71.0	15.1	UHSU		Bedrock	SPM2
2587	1987		06/02/03	2086748	749719	5959.48	5960.98	17.5	43.5	43.7	16.5	UHSU	Ksltss & Kss	Bedrock	2587BR, 25-87BR
2686	1986		08/30/04	2084841	750411	5975.42	5977.17	3.8	11.0	11.0	10.5	UHSU	Qrf	Alluvium	26-86
2687	1987		04/05/05	2087490	749256	5954.28	5955.90	4.0	13.5	13.7	14.5	UHSU	Qrf	Alluvium	26-87
2787	1987		07/16/03	2088051	749438	5947.80	5949.65	3.5	43.0	43.3	44.2	UHSU	Qrf	Alluvium	27-87
28295	1995		03/13/03	2086358	751763	5852.10	5852.10	6.0	15.0	15.0		UHSU		Bedrock	
2886	1986			2085240	750803	5962.38	5964.38	4.0	8.6	8.6	8.5	UHSU	Qrf	Alluvium	28-86
29395	1995		01/08/03	2084237	751250	5934.60	5934.60	7.0	12.0	12.0		UHSU		Bedrock	
2986	1986		08/11/04	2085687	750599	5959.58	5960.68	2.8	8.8	8.8	8.5	UHSU	Qrf	Alluvium	29-86
2987	1987		09/06/02	2087362	748089	5812.61	5814.29	3.5	20.3	20.6	19.8	UHSU	Qls	Alluvium	29-87
30002	2002	08/22/02		2083909	751692	5929.37	5930.88	4.4	16.4	16.5	0.6	UHSU	Kclystn,sltyclstn	Bedrock	
30100	2000	09/22/00	04/07/05	2083639	751833	5962.28	5963.20	5.0	25.9	26.0	8.3	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
30200	2000	09/26/00	06/03/04	2083852	751884	5959.08	5960.08	5.0	27.9	28.0	1.8	UHSU	Kclystn,sltstn,ss	Bedrock	
30300	2000	09/20/00	06/03/04	2084010	751952	5957.06	5957.90	5.3	19.9	20.0	15.9	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
30400	2000	09/27/00	05/05/04	2084237	752127	5966.26	5967.23	5.3	29.9	30.0	5.4	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
30500	2000	10/12/00	05/05/04	2084369	752425	5962.71	5963.75	5.1	30.9	31.0	5.9	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
30595	1995		01/01/03	2084617	751497	5910.40	5910.40	15.0	22.0	22.0		UHSU		Bedrock	
30600	2000	10/03/00	04/07/05	2084230	752699	5945.36	5946.36	5.2	30.9	31.0	1.8	UHSU	Kclystn	Bedrock	
30700	2000	09/29/00	05/05/04	2084089	752744	5935.24	5936.27	5.0	27.9	28.0	1.0	UHSU	Kclystn	Bedrock	
30800	2000	10/04/00	05/05/04	2083874	752372	5971.07	5971.98	2.9	21.9	22.0	6.9	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
3086	1986		05/08/03	2084921	751078	5957.42	5958.39	2.5	14.9	14.9	2.5	UHSU	Kclst	Bedrock	30-86
308-P-1	1994		12/10/02	2084165	751968	5942.07	5944.11	9.0	40.0	40.0	5.0	UHSU		Alluvium/Bedrock	
308-P-2	1994		12/10/02	2084580	752052	5941.97	5944.02	9.0	40.0	40.0	5.0	UHSU		Alluvium/Bedrock	
308-P-3	1997	02/11/97	12/10/02	2084592	751904	5940.00	5942.20	3.0	32.5	33.0	22.0	UHSU		Alluvium/Bedrock	
30900	2000	09/19/00		2082020	751767	6005.71	6006.76	5.7	30.9	31.0	21.5	UHSU	Qrf/Kss,clystn	Alluvium/Bedrock	
30991	1991	08/20/91	05/25/05	2085295	747745	5849.77	5851.82	5.1	9.9	12.3	8.8	UHSU	Qp	Alluvium/Bedrock	
31001	2001	01/18/01	06/28/05	2082030	751766	6005.17	6005.58	2.6	22.2	22.2	21.5	UHSU		Alluvium/Bedrock	
31491	1991	08/28/91	10/12/04	2084649	747749	5902.58	5905.03	13.9	18.9	21.3	16.5	UHSU	Qls & Ksltss	Alluvium/Bedrock	
31791	1991	08/28/91		2084276	747425	5877.06	5879.80	6.8	11.8	14.2	8.8	UHSU	Qls & Kclst	Alluvium/Bedrock	
3186	1986		07/11/03	2084764	751051	5964.98	5967.05	2.5	17.3	17.3	0.5	UHSU	Kss & Kslt	Bedrock	31-86
31891	1991	05/10/89	10/11/04	2084142	747661	5916.91	5919.52	16.6	18.6	21.0	17.2	UHSU	Qls & Kcss	Alluvium/Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
32591	1991	04/26/89	06/23/05	2084852	747976	5914.86	5917.41	11.5	16.5	18.9	16.0	UHSU	Qls	Alluvium	
3287	1987		09/16/04	2088363	749511	5946.38	5947.97	36.0	46.6	46.8	46.2	UHSU	Qrf	Alluvium	32-87
33491	1991	05/15/89	09/27/04	2084883	748080	5926.06	5928.59	6.7	8.7	11.1	8.0	UHSU	Qls & Ksclst	Alluvium	
33502	2002	12/12/02		2081978	749872	6020.06	6019.51	4.1	39.2	39.4	39.0	UHSU	Qaf	Alluvium	
33603	2003	10/09/03	11/16/04	2082104	750004	6016.29	6015.89	5.3	27.4	27.5	25.3	UHSU	af,Qc?,Qrf?/Kclysndysiltstn	Alluvium/Bedrock	
33604	2004	06/08/04		2082101	750000	6016.29	6016.00	7.3	29.3	29.4	25.3	UHSU	af,Qc?,Qrf?/Kclysndysiltstn	Alluvium/Bedrock	
33703	2003	10/07/03		2082126	750104	6015.04	6014.54	5.4	33.5	33.6	24.1	UHSU	af,Qc?/Kclstn	Alluvium/Bedrock	
33803	2003	10/03/03	01/19/05	2081914	750163	6016.25	6017.75	5.3	27.4	27.5	19.5	UHSU	af,Qc?,Qrf?/Kclstn	Alluvium/Bedrock	
3386	1986		02/09/05	2085003	749950	5951.40	5952.42	3.0	7.3	7.3	6.8	UHSU	Qc	Alluvium	33-86
3387	1987		04/13/04	2087921	749855	5945.78	5947.22	15.0	20.0	20.3	19.0	UHSU	Qrf	Alluvium	3387, BH56-87
33891	1991	06/16/89	09/27/04	2084641	747961	5927.54	5929.94	6.7	8.7	11.1	8.1	UHSU	Qls & Kclst	Alluvium/Bedrock	
33904	2004	06/15/04		2082683	750160	6006.87	6009.00	9.7	34.8	34.9	32.0	UHSU	Qaf,Qc,Kclystn,Ksltstn	Alluvium/Bedrock	
34591	1991	06/19/89	11/03/04	2085621	748462	5952.19	5954.63	6.9	8.9	11.3	8.2	UHSU	Qls & Kclst	Alluvium/Bedrock	
34791	1991	11/01/89	05/03/04	2085521	748377	5951.39	5953.91	6.0	8.0	10.4	8.0	UHSU	Qls	Alluvium	
3486	1986		01/21/04	2086193	750162	5912.00	5913.95	44.2	56.3	56.3	16.0	UHSU	Kcss & Kcslt	Bedrock	34-86
35391	1991	11/08/89	09/27/04	2083907	748011	5960.73	5963.03	6.1	8.1	10.5	6.0	UHSU	Kclst	Alluvium/Bedrock	
35691	1991	11/30/89		2084005	747797	5938.76	5941.36	15.6	26.6	29.0	25.2	UHSU	Qls	Alluvium	
3586	1986			2086219	750167	5910.75	5912.76	4.9	11.6	11.6	10.5	UHSU	Qc	Alluvium	35-86
36191	1991	12/07/89	11/03/04	2084198	748091	5962.89	5965.17	9.5	14.6	17.0	14.0	UHSU	Qls	Alluvium	
36391	1991	02/05/90	11/03/04	2084294	748042	5964.57	5967.01	17.4	27.4	29.8	26.4	UHSU	Qrf	Alluvium	
36691	1991	10/11/91	09/27/04	2084421	748027	5949.76	5951.52	15.8	25.8	27.8	25.0	UHSU	Qrf	Alluvium/Bedrock	
3686	1986		03/23/05	2086820	750387	5883.69	5885.22	3.5	6.5	6.5	5.5	UHSU	Qc	Alluvium	36-86
3687	1987			2087295	749979	5949.67	5951.11	19.8	63.4	63.6	7.4	UHSU	Kss & Kslt & Kclst	Bedrock	3687BR, 36-87BR
36991	1991	10/11/91	05/10/04	2084177	748180	5969.48	5972.31	6.6	8.6	10.6	8.0	UHSU	Qrf & Kclst	Alluvium/Bedrock	
37101	2001	05/10/01	01/25/05	2081935	750496	6012.86	6012.38	5.2	19.9	20.1	15.9	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
37191	1991	10/15/91	09/27/04	2084533	748036	5945.91	5948.29	11.1	21.1	23.1	20.5	UHSU	Qls	Alluvium	
37201	2001	05/15/01	01/25/05	2082352	750306	6008.55	6007.98	4.9	29.5	29.7	23.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
37301	2001	05/16/01	01/25/05	2082510	750360	6008.09	6007.69	4.9	23.8	24.0		UHSU	Qrf	Alluvium	
37401	2001	05/21/01		2082593	750665	6007.39	6006.76	10.0	40.5	40.7	26.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
37402	2002	01/08/02	01/25/05	2082586	750662	6007.43	6007.17	8.9	41.1	41.3	26.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
37501	2001	05/23/01	01/25/05	2082413	750697	6007.27	6006.82	9.8	36.8	36.9	25.9	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
37591	1991	10/21/91		2084610	748580	5991.42	5993.45	7.6	12.6	14.6	12.0	UHSU	Qrf	Alluvium	
37601	2001	05/08/01	01/25/05	2082205	750697	6010.42	6009.93	8.3	37.7	37.8	23.3	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
37691	1991	10/18/91		2085217	748692	5984.46	5985.24	6.5	16.5	18.5	16.2	UHSU	Qrf	Alluvium	
37701	2001	05/01/01	01/25/05	2082842	750523	5977.47	5977.14	2.9	20.0	20.1	4.0	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
37791	1991	10/25/91	05/10/04	2083753	748592	6002.16	6004.18	10.6	20.6	22.6	20.0	UHSU	Qrf	Alluvium	
3786	1986			2088854	751561	5796.61	5798.26	3.3	8.6	8.6	7.6	UHSU	Qc	Alluvium	37-86
3787	1987			2085224	750494	5967.52	5968.99	3.5	8.8	9.0	8.0	UHSU	Qrf	Alluvium	37-87
37891	1991	11/13/91	11/08/04	2084915	748075	5925.22	5926.29	43.2	53.2	55.2	4.7	UHSU	Kcsltst & Ksltst	Bedrock	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
37991	1991	11/13/91	12/24/04	2084731	748063	5931.45	5933.55	45.2	55.2	57.2	6.9	UHSU	Kcsltst & Kssltst	Bedrock	
38191	1991	10/29/91	09/27/04	2084765	748014	5924.47	5926.40	10.0	15.0	17.0	14.7	UHSU	Qls	Alluvium	
38291	1991	11/01/91	06/14/05	2084801	748032	5924.49	5926.71	6.7	8.7	10.7	8.4	UHSU	Qls	Alluvium	
38591	1991	11/05/91	05/26/05	2084659	747408	5864.72	5866.62	5.7	7.7	9.7	7.3	UHSU	Qp	Alluvium	
3886	1986		04/30/03	2090261	752835	5734.05	5736.08	2.9	8.5	8.5	6.0	UHSU		Alluvium/Bedrock	38-86
3887	1987		09/12/02	2085094	750396	5972.15	5973.90	3.5	9.3	9.5	7.8	UHSU	Qrf	Alluvium	38-87
38991	1991	11/23/91	06/22/05	2085024	747820	5893.08	5895.45	26.8	36.8	38.8	19.5	UHSU	Kclst, Ksltst, Kcsltst	Bedrock	
39191	1991	12/09/91	11/03/04	2084921	748009	5918.16	5918.32	32.8	42.8	44.8	7.1	UHSU	Ksltst, Kcslt, Kclst	Bedrock	
39291	1991	12/02/91	11/03/04	2084974	747949	5908.38	5910.24	34.0	44.0	46.0	10.8	UHSU	Ksltclst, Kcsltst	Bedrock	
39691	1991	11/26/91	06/09/04	2083634	748357	6006.26	6008.37	7.0	9.0	11.0	8.0	UHSU	Qrf & Kclst	Alluvium/Bedrock	
3986	1986		06/14/05	2090689	751305	5908.23	5909.41	5.0	31.5	31.5	30.5	UHSU	Qrf	Alluvium	39-86
40099	1999	08/25/99	02/17/05	2082074	748703	6026.38	6025.97	13.4	28.2	28.4	27.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
40193	1993		05/05/03	2085407	751567	5902.70	5904.65	12.0	22.0	34.1	21.4	UHSU	Qls	Alluvium	
40199	1999	08/19/99	02/10/05	2082211	748950	6023.82	6023.42	12.7	27.8	28.0	26.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
40299	1999	08/30/99	02/17/05	2082198	748521	6024.52	6024.16	12.8	27.4	27.6	27.6	UHSU	Qrf/Kclystn	Alluvium	
40399	1999	09/07/99	02/17/05	2082576	748750	6020.43	6019.91	12.7	24.4	24.8	23.8	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
40499	1999	09/01/99	02/10/05	2082457	748659	6021.11	6020.58	15.1	24.8	25.0	24.8	UHSU	Qrf	Alluvium	
40599	1999	09/23/99	08/02/04	2083646	751142	5945.06	5944.54	4.1	10.9	11.2	6.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
40699	1999	09/29/99	08/02/04	2083830	751173	5942.63	5941.84	7.3	14.2	14.8	11.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
40799	1999	09/29/99	03/29/04	2083993	751121	5945.13	5944.63	5.4	10.1	10.2	5.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
4087	1987			2084823	753143	5883.00	5884.61	3.5	6.5	6.7	5.8	UHSU	Qls	Alluvium	40-87
40899	1999	09/30/99	04/28/04	2084072	750953	5979.79	5979.24	8.1	14.5	15.1	11.7	UHSU	Qrf/Kss,clystn	Alluvium/Bedrock	
40999	1999	10/21/99	02/21/05	2084311	749097	5989.39	5988.78	5.1	8.0	10.3	6.8	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
41091	1991	11/11/91	06/08/05	2089994	753241	5719.56	5721.85	7.8	10.0	12.3	10.0	UHSU	Qp	Alluvium	
41099	1999	09/10/99	02/21/05	2084452	749208	5986.94	5986.44	4.6	12.4	10.5	6.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
41102	2002	08/19/02	02/08/05	2084471	749052	5987.42	5986.92	5.3	20.4	20.5		UHSU			
41193	1993		01/20/03	2084874	751044	5960.70	5962.52	3.0	8.0	10.0	7.8	UHSU	Qc	Alluvium	
41199	1999	09/15/99	05/01/02	2084468	749052	5987.90	5987.51	5.3	12.0	12.2	7.1	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
41299	1999	09/09/99	02/10/05	2082438	748516	6020.47	6019.68	10.5	24.9	25.0	24.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
41491	1991	11/04/91	04/19/05	2093975	744916	5627.44	5630.21	6.8	9.7	12.0	9.4	UHSU	Qp	Alluvium	
41499	1999	09/23/99	08/02/04	2083757	751199	5944.07	5943.57	5.9	13.9	17.0		UHSU	Qrf	Alluvium/Bedrock	
41591	1991	11/06/91	04/19/05	2093914	748800	5725.54	5727.27	6.3	11.0	13.5	11.0	UHSU	Qc	Alluvium	
41599	1999	09/30/99	03/24/04	2084096	751163	5947.69	5947.13	10.1	14.9	15.0	10.5	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
41691	1991	11/08/91		2093851	753470	5643.95	5645.88	5.1	14.7	17.1	14.7	UHSU	Qp	Alluvium	
41693	1993		09/12/02	2084912	750866	5972.00	5975.25	6.0	16.0	18.0	14.1	UHSU		Alluvium/Bedrock	
4186	1986		07/16/03	2088543	749609	5942.62	5944.36	3.9	44.7	44.7	44.6	UHSU	Qrf	Alluvium	41-86
41993	1993		11/22/04	2084283	750874	5978.70	5978.34	4.5	14.5	16.5	7.6	UHSU		Alluvium/Bedrock	
42393	1993		09/15/04	2084286	750804	5980.20	5981.96	3.0	13.0	15.0	8.1	UHSU		Alluvium/Bedrock	
4286	1986		04/06/05	2087114	749559	5956.27	5957.87	6.1	29.7	29.7	28.3	UHSU	Qrf	Alluvium	42-86

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
4287	1987		06/23/05	2085525	753342	5854.34	5855.87	3.0	6.4	6.6	6.1	UHSU	Qp	Alluvium	42-87
42893	1993		05/02/03	2084452	750612	5978.10	5980.35	5.8	12.0	12.0	7.2	UHSU		Alluvium/Bedrock	
42993	1993		09/15/04	2084552	750748	5978.05	5980.75	6.0	16.0	18.0	12.9	UHSU		Alluvium/Bedrock	
43293	1993		06/10/03	2085753	750826	5955.50	5958.14	9.0	14.0	16.0	10.0	UHSU		Alluvium/Bedrock	
43392	1992	04/10/92	05/03/04	2081537	748034	6041.86	6043.44	25.6	30.3	32.8	31.4	UHSU	Qrf	Alluvium	
43492	1992	04/21/92		2087281	743670	5990.09	5991.09	36.1	41.1	43.5	39.4	UHSU	Qrf	Alluvium	
43593	1993		01/15/03	2084456	750612	5978.00	5979.94	6.0	11.0	13.0	7.0	UHSU		Alluvium/Bedrock	
4386	1986		02/15/05	2085869	749404	5972.91	5974.46	4.0	16.8	16.8	17.0	UHSU	Qrf	Alluvium	43-86
4387	1987		06/14/05	2084788	748030	5925.06	5926.41	3.5	12.3	12.5	12.0	UHSU	Qls	Alluvium	43-87, 5787, BH57-87
43893	1993		09/12/02	2084655	750453	5977.50	5980.09	9.0	14.0	16.0	12.0	UHSU	Qrf	Alluvium/Bedrock	
43993	1993		09/12/02	2084909	750486	5972.90	5976.39	6.0	16.0	18.0	13.0	UHSU		Alluvium/Bedrock	
44202	2002	08/21/02	03/16/05	2082236	749226	6022.42	6023.85	5.4	30.3	30.4		UHSU			
44303	2003	09/30/03	03/16/05	2082360	749135	6021.07	6022.37	4.6	29.6	29.7	29.5	UHSU	Qrf	Alluvium	
4486	1986		08/20/02	2082234	749254	6019.93	6021.96	3.2	26.3	26.3	25.5	UHSU	Qrf	Alluvium	44-86
4487	1987		07/09/03	2085435	748306	5949.63	5951.10	1.5	3.5	3.7	3.2	UHSU	Qls	Alluvium	44-87, BH58-87
45093	1993			2085546	751315	5928.00	5929.86	6.7	11.7	13.7	12.0	UHSU	Qls	Alluvium	
45391	1991		10/05/04	2084847	747791	5891.17	5894.24	12.7	17.7	20.2		UHSU	Qls	Alluvium	MW-2-92, MW02
45393	1993			2085437	751368	5923.70	5925.66	6.7	16.7	18.7	16.7	UHSU	Qls	Alluvium	
45693	1993		06/11/03	2084514	751221	5936.80	5938.81	1.5	5.5	8.0	1.0	UHSU		Bedrock	
4586	1986			2079470	750316	6049.99	6051.55	3.0	48.2	48.2	49.7	UHSU	Qp	Alluvium	45-86
45893	1993		05/08/03	2084467	751113	5960.40	5962.50	8.0	18.0	20.0	9.0	UHSU		Alluvium/Bedrock	
46192	1992	09/08/92	08/05/04	2076092	748822	6141.50	6143.37	57.2	77.2	80.0	77.0	UHSU	Qrf	Alluvium	
46193	1993		01/20/03	2084858	751219	5935.70	5938.70	2.0	7.0	9.0	2.2	UHSU		Alluvium/Bedrock	
46292	1992	08/06/92	09/30/04	2078128	749430	6095.30	6097.24	45.5	90.5	93.3	90.5	UHSU	Qrf	Alluvium	
46293	1993		07/11/03	2084859	751180	5939.60	5941.59	3.0	8.0	10.0	8.0	UHSU	Qc	Alluvium	
46392	1992	08/14/92	07/22/02	2079667	749987	6063.20	6065.03	64.5	79.5	82.3	56.0	UHSU	Kclst	Bedrock	
46393	1993		05/05/03	2085418	751573	5900.40	5902.74	12.5	22.5	24.5	22.0	UHSU	Qls	Alluvium	
46492	1992	09/04/92	08/04/04	2080245	749747	6054.70	6056.81	28.2	43.2	46.0	43.0	UHSU	Qrf	Alluvium	
4786	1986			2078289	750825	6081.90	6083.67	6.2	94.5	94.5	93.0	UHSU	Qrf	Alluvium	47-86
4787	1987			2084903	747779	5882.76	5884.64	3.5	7.3	7.5	9.0	UHSU	Qls	Alluvium	47-87
4887	1987			2084691	747829	5909.67	5911.41	3.5	10.1	10.3	10.0	UHSU	Qls	Alluvium	48-87
4986	1986			2078288	748965	6097.37	6098.89	4.1	67.6	67.6	68.0	UHSU	Qrf	Alluvium	49-86
4987	1987		06/27/03	2085004	747991	5912.66	5914.27	1.8	4.8	5.0	9.0	UHSU	Qls	Alluvium	49-87
50092	1992		01/04/05	2086417	747687	5820.48	5822.30	5.3	10.3	13.1	10.2	UHSU	Qp	Alluvium	
50099	1999	10/26/99	06/28/05	2086239	749010	5971.09	5973.02	10.7	20.7	21.7	20.4	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
50194	1994		07/16/02	2077234	749310	6114.40	6116.29	74.7	94.7	97.0		UHSU		Alluvium	
50199	1999	11/02/99	08/01/02	2085980	749168	5972.86	5975.44	10.7	20.7	22.5		UHSU		Alluvium/Bedrock	
50292	1992		05/26/05	2089313	747328	5742.41	5744.46	4.5	9.5	12.4	9.8	UHSU	Qc	Alluvium	
50294	1994		07/17/02	2076128	748705	6142.00	6143.91	5.9	15.9	18.2		UHSU		Alluvium	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
50299	1999	08/27/99		2086784	748911	5924.08	5926.08	9.8	14.3	14.6	2.4	UHSU	Qrf/Ksltstn,clystn	Alluvium/Bedrock	
50394	1994		07/16/02	2077216	748529	6120.30	6122.21	49.5	64.5	66.8		UHSU		Alluvium	
50399	1999	08/18/99	05/26/04	2083069	748920	6012.82	6015.22	17.1	22.1	22.5	20.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
50694	1994		08/04/04	2078742	749392	6085.50	6087.50	11.8	26.8	29.1		UHSU		Alluvium	
5070	1970			2084211	751028	5962.55				24.0		UHSU		Bedrock	1-774-00
5071	1971			2081911	749031	6028.90	6030.50			17.1		UHSU	Qrf	Alluvium	2-441-71, 441-2
50794	1994		07/17/02	2076816	747899	6132.80	6134.81	13.0	23.0	25.0		UHSU		Alluvium	
5086	1986		07/24/02	2077299	747783	6121.04	6122.94	2.9	96.2	96.2	98.0	UHSU	Qrf	Alluvium	50-86
50894	1994		07/16/02	2077776	748289	6111.40	6113.37	10.0	25.0	27.3		UHSU		Alluvium	
50994	1994		07/16/02	2077650	749173	6107.60	6109.71	13.0	23.0	24.0		UHSU		Alluvium	
51094	1994		07/25/05	2078674	748630	6091.20	6093.25	37.7	57.7	60.0	58.0	UHSU		Alluvium	
51193	1993		01/04/05	2086379	747775	5815.11	5817.10	5.2	7.7	10.0	7.1	UHSU	Qp	Alluvium	
51194	1994		09/30/04	2079328	749884	6071.40	6073.31	35.0	50.0	52.0		UHSU		Alluvium	
51294	1994		06/02/04	2079847	749278	6062.80	6064.68	20.0	35.0	37.3		UHSU		Alluvium	
51494	1994		05/26/05	2078256	748982	6097.40	6099.26	48.7	68.7	70.7	69.0	UHSU		Alluvium	
51594	1994		07/23/02	2078256	748972	6097.50	6099.49	10.0	20.0	20.0		UHSU		Alluvium	
51694	1994		07/23/02	2078239	749639	6092.50	6094.61	45.0	60.0	5.0	27.3	UHSU		Alluvium	
5170	1970			2083826	750621	5987.13				13.3		UHSU	Qrf	Alluvium	1-776-00, 776-W
5186	1986		09/05/02	2076136	748575	6142.37	6144.25	4.8	79.1	79.1	78.5	UHSU	Qrf	Alluvium	51-86
5187	1987		06/09/04	2083850	748103	5963.27	5965.22	3.6	13.8	14.0	12.5	UHSU	af	Alluvium	51-87, BH62-87
5270	1970			2083843	750631	5986.19	5987.29			13.4		UHSU	Qrf	Alluvium	2-776-00, 776-E
5286	1986		09/09/02	2076132	748607	6142.14	6144.44	92.0	125.8	125.7	72.0	UHSU	Kss & Ksltclst	Bedrock	52-86
5287	1987		05/10/04	2084067	748145	5967.85	5969.57	3.5	20.3	20.5	20.0	UHSU	af	Alluvium	52-87, BH63-87
52894	1994		07/25/05	2085099	753222	5870.18	5870.75	3.0	4.0	6.0	4.0	UHSU		Alluvium	
53194	1994		03/10/03	2086037	753434	5838.81	5839.38	4.5	7.0	9.4	7.0	UHSU		Alluvium	
5386	1986		08/29/02	2078382	745960	6065.75	6066.63	2.5	7.8	7.8	7.0	UHSU	Qrf	Alluvium	53-86
5387	1987		09/27/04	2083912	747985	5959.99	5961.81	3.5	9.1	9.3	10.0	UHSU	Qls	Alluvium	53-87
5474	1974			2086320	751074	5933.22	5936.81	4.0	18.0	18.0	9.0	UHSU		Alluvium/Bedrock	14-SEP-74, TH-14
5487	1987		06/09/03	2084032	747985	5955.85	5957.62	1.3	4.5	4.7	4.0	UHSU	Qls	Alluvium	54-87
55194	1994		06/25/03	2079113	747538	6046.10	6048.69	9.0	19.0	19.0	16.1	UHSU		Alluvium/Bedrock	
55394	1994		06/26/03	2079129	747297	6021.60	6023.55	3.5	8.5	12.0	6.8	UHSU		Alluvium/Bedrock	
5570	1970			2084885	749656	5974.17				39.5		UHSU		Bedrock	
5586	1986		03/17/05	2078340	745223	6116.64	6118.72	3.6	36.4	36.4	35.5	UHSU	Qrf	Alluvium	55-86, B405586
5587	1987		05/26/05	2084919	747619	5858.39	5860.09	3.4	7.4	7.5	5.5	UHSU	Qls	Alluvium	55-87
55901	2001	11/08/01	02/03/05	2083345	750292	5996.16	5995.92	9.8	26.8	26.9	21.3	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
56001	2001	11/13/01	01/26/05	2083575	750210	5994.51	5994.12	8.8	23.9	24.0	16.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
56101	2001	12/04/01	02/01/05	2083584	750134	5991.95	5991.54	7.9	24.9	25.0	11.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
56201	2001	11/20/01	01/26/05	2083341	750046	5999.07	5998.46	8.8	25.9	26.0	21.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
56294	1994		07/01/03	2080135	747400	6017.30	6018.49	6.0	16.0	16.0	8.9	UHSU		Alluvium/Bedrock	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
56301	2001	11/16/01	02/03/05	2083229	750186	5996.35	5995.98	10.0	26.9	27.0	22.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
56494	1994		06/25/03	2080703	747585	6011.70	6012.69	4.0	14.0	14.0	10.0	UHSU		Alluvium/Bedrock	
56594	1994		06/25/03	2080804	747175	5969.60	5970.85	3.0	8.0	8.0	6.8	UHSU		Alluvium	
5670	1970			2083670	750712	5985.40	5988.07			32.8		UHSU		Bedrock	5670A, 710-S, 710-8
5671	1971			2081526	749146	6037.19	6037.30			11.0		UHSU	Qrf	Alluvium	2-122-71
5686	1986		11/02/04	2080220	747042	5987.46	5988.93	2.6	9.6	9.6	9.0	UHSU	Qp	Alluvium	56-86
5687	1987		05/02/03	2084423	750638	5978.39	5979.77	3.5	9.7	9.9	9.4	UHSU	Qrf	Alluvium	56-87, SP16-87
56994	1994			2082009	747987	6019.80	6021.63	14.5	24.5	26.5	24.4	UHSU		Alluvium	
57094	1994			2081996	747719	5970.20	5972.12	24.0	34.0	36.0	34.0	UHSU		Alluvium	
5774	1974			2086075	750822	5956.04	5959.14	4.0	12.0	15.7	13.5	UHSU		Alluvium	15-SEP-15, TH-15
5786	1986		06/09/03	2081572	747559	5951.46	5952.88	2.5	6.5	6.8	6.0	UHSU	Qls	Alluvium	57-86
57894	1994			2081741	747565	5949.90	5950.01	5.0	10.0	10.0		UHSU		Alluvium	
57994	1994			2082266	747547	5939.80	5941.27	2.0	7.0	7.0	7.0	UHSU		Alluvium	
58094	1994			2082247	747452	5929.60	5930.91	3.0	11.0	11.0	10.0	UHSU		Alluvium	
58194	1994			2082380	747493	5928.60	5930.63	3.0	8.0	8.0	6.6	UHSU		Alluvium	
58494	1994			2082460	747922	5994.80	5996.38	5.0	10.0	10.0	12.8	UHSU		Alluvium	
58594	1994			2082791	747519	5917.90	5920.14	1.0	6.0	8.0	5.4	UHSU		Alluvium	
58793	1993			2080605	747512	6012.60	6014.20	14.8	24.8	27.3	24.6	UHSU	Qls	Alluvium	
5886	1986			2083435	747084	5895.21	5897.65	1.5	3.5	3.5	3.0	UHSU	Qp	Alluvium	58-86
5887	1987		07/05/05	2082531	752234	5995.46	5996.77	3.5	22.3	22.5	22.0	UHSU	Qrf	Alluvium	58-87
59093	1993			2079327	747350	6022.85	6024.70	4.3	14.3	17.2	14.3	UHSU	Qls	Alluvium	
59194	1994			2081690	747997	6037.70	6039.74	26.0	36.0	38.0	33.4	UHSU		Alluvium	
59294	1994			2081620	747691	5980.80	5982.73	15.0	17.0	19.0	14.0	UHSU		Alluvium/Bedrock	
59393	1993			2081489	747555	5952.62	5954.70	2.5	7.5	10.0	7.5	UHSU	Qls	Alluvium	
59493	1993			2081536	747824	5990.76	5992.40	7.9	12.9	15.8	14.9	UHSU	Qls	Alluvium	
59593	1993			2081786	747577	5951.75	5953.00	3.0	13.0	15.9	13.0	UHSU	Qls	Alluvium	
59594	1994			2081244	747981	6046.70	6048.91	27.6	37.6	39.6	37.5	UHSU		Alluvium	
59694	1994			2081356	747760	5997.00	5999.00	6.0	16.0	18.0	16.1	UHSU		Alluvium	
5971	1971			2084124	749205	5992.61				10.0		UHSU	Qrf	Alluvium	1-865-71
5974	1974			2085580	751815	5856.87	5858.82	2.0	11.0	14.1	6.5	UHSU		Alluvium/Bedrock	24-SEP-74,TH-24
59793	1993			2082128	747553	5944.85	5945.80	8.7	13.7	16.6	13.3	UHSU	Qls	Alluvium	
59794	1994			2081635	747922	6006.40	6008.88	11.0	21.0	23.0	15.5	UHSU		Alluvium	
5986	1986			2084267	747754	5920.30	5921.90	19.0	28.0	28.0	7.5	UHSU	Kss & Kcslt	Bedrock	59-86
59993	1993			2082132	747550	5944.20	5944.30	11.3	16.3	16.3		UHSU	Qls	Alluvium	
60093	1993			2082046	747565	5945.21	5945.40	4.8	9.8	9.8		UHSU	Qls	Alluvium	
60194	1994		04/14/04	2086848	748853	5916.18	5917.52			9.9		UHSU		Alluvium	
60195	1995		03/22/05	2086895	750271	5899.50	5900.00	6.0	11.0	11.0	10.4	UHSU		Alluvium	S1,
60199	1999	10/04/99	11/15/04	2083620	750447	5987.18	5986.68	4.9	9.7	9.9	7.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60293	1993			2081847	747596	5949.38	5949.50	7.0	12.0	12.0		UHSU	Qls	Alluvium	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
60294	1994		04/14/04	2086859	748914	5920.79	5921.83			8.9		UHSU		Alluvium	
60295	1995			2087015	750312	5896.40	5897.00	6.3	16.2	16.2	14.0	UHSU		Alluvium	S2
60299	1999	10/06/99	01/19/05	2083628	750370	5987.38	5986.88	4.9	9.7	9.9	7.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60393	1993			2081539	747619	5963.07	5963.20	6.3	11.3	11.3		UHSU	Qls	Alluvium	
60394	1994		04/14/04	2086746	748892	5924.24	5925.18			14.9		UHSU		Bedrock	
60395	1995		03/22/05	2087086	750410	5886.40	5887.00	3.4	8.3	8.3	6.0	UHSU		Alluvium	S3
60399	1999	10/08/99	10/25/04	2083650	750239	5986.70	5986.23	6.2	11.1	11.2	6.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60493	1993			2081257	747589	5984.57	5984.70	9.0	14.0	14.0		UHSU	Qls	Alluvium	
60494	1994		04/14/04	2086748	748894	5924.46	5925.50	7.0	10.0	10.8		UHSU		Alluvium	
60499	1999	10/11/99	11/04/04	2083697	750074	5991.76	5991.02	8.0	15.0	15.1	10.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60593	1993			2080973	747676	6015.11	6015.30	10.4	15.4	15.4		UHSU	Qls	Alluvium	
60594	1994		04/14/04	2086749	748896	5924.52	5925.56			20.8		UHSU		Bedrock	
60599	1999	10/11/99	11/04/04	2083735	749909	5988.51	5987.91	5.0	9.9	10.1	5.4	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60693	1993			2080896	747685	6023.61	6023.70	12.8	17.8	17.8		UHSU	Qls	Alluvium	
60694	1994		04/14/04	2086679	748905	5930.63	5931.67			14.6		UHSU		Bedrock	
60695	1995		10/12/04	2088954	750816	5885.00	5885.00	9.0	13.9	13.9	13.0	UHSU		Alluvium	S6
60699	1999	10/08/99	11/04/04	2083741	749790	5987.42	5986.92	5.2	10.1	10.2	2.3	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60794	1994		04/14/04	2086677	748905	5930.83	5931.87	12.0	13.0	13.6		UHSU		Bedrock	
60799	1999	10/12/99	01/13/05	2083679	749623	5993.75	5993.14	4.9	9.7	9.9	5.3	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
6087	1987		04/20/04	2083035	752930	5984.44	5985.96	3.5	27.5	27.7	27.0	UHSU	Qrf	Alluvium	60-87
60893	1993			2081585	747843	5999.89	6000.00	18.2	23.2	23.2		UHSU	Qls	Alluvium	
60894	1994		04/14/04	2086676	748904	5930.94	5931.98			9.5		UHSU		Alluvium	
60899	1999	09/21/99	03/21/05	2083670	749389	5996.09	5995.67	6.4	12.2	12.3	10.2	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
60993	1993			2081948	747817	5985.37	5986.90	3.0	8.0	8.2	3.9	UHSU	Qls	Alluvium	
60994	1994		04/14/04	2086570	748807	5931.13	5932.07	8.0	11.3	11.7		UHSU		Alluvium	
61093	1993			2081952	747764	5972.02	5973.60	3.0	13.0	13.1	9.0	UHSU	Qls	Alluvium	
61094	1994		04/19/04	2086634	748870	5931.40	5932.24	12.0	14.8	14.9		UHSU		Bedrock	
61099	1999	09/20/99	02/10/05	2083676	749079	6002.29	6001.81	9.2	16.0	16.1	13.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
61194	1994		04/19/04	2086555	748849	5936.23	5937.27			14.5		UHSU		Alluvium	
61199	1999	09/16/99	02/07/05	2083676	748893	6003.31	6002.80	9.3	19.3	19.5	17.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
61293	1993			2081148	747523	5985.03	5986.70	3.0	8.0	10.9	7.0	UHSU	Qls	Alluvium	
61294	1994		04/19/04	2086556	748850	5936.45	5937.49			12.3		UHSU		Bedrock	
61295	1995		10/11/04	2084708	747517	5867.00	5867.00	5.4	10.4	10.4	8.0	UHSU		Alluvium	S12
61299	1999	09/16/99		2083675	748727	6003.88	6003.48	7.2	12.0	12.2	9.8	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
61399	1999	10/12/99	01/24/05	2083989	749643	5984.47	5983.89	5.0	9.9	10.0	1.5	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
61494	1994		04/19/04	2086505	748895	5944.45	5945.49	12.5	13.8	14.5		UHSU		Bedrock	
61495	1995		04/07/05	2082874	751608	5977.50	5978.00	7.2	12.2	12.2	11.5	UHSU		Alluvium	S14
61499	1999	10/14/99	11/04/04	2084033	750236	5986.87	5986.33	4.9	9.9	10.1	7.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
61594	1994		04/19/04	2086503	748895	5932.47	5945.33	18.1	19.1	19.8		UHSU		Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
61595	1995		04/07/05	2083151	751716	5972.60	5973.00	6.0	10.9	10.9	10.0	UHSU		Alluvium	S15
61695	1995		10/07/04	2082309	751379	5987.50	5988.00	4.5	14.4	14.4	11.5	UHSU		Alluvium	S16
6186	1986		02/15/05	2083717	749198	5999.47	6000.60	5.0	12.0	12.3	11.5	UHSU	Qls	Alluvium	61-86
6187	1987			2083072	752860	5984.42	5985.77	3.5	28.2	28.5	28.0	UHSU	Qrf	Alluvium	61-87
62095	1995		05/07/03	2089081	749369	5897.00	5897.00	4.9	14.8	14.8	10.0	UHSU		Alluvium	T4
62593	1993			2079457	747620	6047.58	6047.80	3.4	8.4	8.4		UHSU	Qc	Alluvium	
62693	1993		10/18/04	2079926	747627	6041.60	6041.80	3.6	8.6	8.6		UHSU	Qls	Alluvium	
6274	1974			2085154	751738	5871.23	5874.33	4.0	15.0	20.1	7.0	UHSU		Alluvium/Bedrock	27-SEP-74, TH-28
62793	1993			2082304	747547	5939.43	5939.50	6.8	11.8	11.8		UHSU	Qls	Alluvium	
6286	1986		06/22/05	2085725	748143	5902.01	5903.18	25.2	35.2	35.2	22.0	UHSU	Kslss & Kcss	Bedrock	62-86
6287	1987			2083097	752800	5984.54	5986.37	3.5	26.6	26.8	26.3	UHSU	Qrf	Alluvium	62-87
62893	1993		03/03/05	2082700	747964	5995.03	5995.20	9.8	14.8	14.8		UHSU	Qc	Alluvium	
63093	1993			2079751	747357	6017.09	6019.20	7.0	22.0	24.8	19.6	UHSU		Alluvium/Bedrock	
63193	1993			2082542	747697	5968.54	5970.00	11.1	21.1	21.1	16.0	UHSU		Alluvium/Bedrock	
63293	1993		10/07/04	2086375	747774	5815.62	5815.70	5.0	7.6	7.6		UHSU	Qp	Alluvium	
63393	1993		10/07/04	2086381	747784	5815.26	5815.50	2.9	4.5	4.5		UHSU	Qp	Alluvium	
63493	1993		10/07/04	2086385	747774	5815.50	5815.70	4.9	9.9	9.9		UHSU	Qp	Alluvium	
63593	1993		06/25/03	2080603	747514	6012.69	6012.80	14.4	24.3	24.3		UHSU	Qls	Alluvium	
63693	1993		03/06/03	2080608	747502	6011.93	6012.20	14.8	21.8	21.8		UHSU	Qls	Alluvium	
63695	1995		09/04/02	2079014	750260	6066.09		5.1	10.1	10.1		UHSU		Alluvium	T20
6374	1974			2084589	751806	5907.55	5909.55	6.0	15.0	18.5	10.0	UHSU		Alluvium/Bedrock	31 SEP-74, TH-31
63793	1993		06/25/03	2080611	747515	6012.17	6013.00	10.1	19.9	19.9		UHSU	Qls	Alluvium	
63795	1995		09/20/02	2078567	752032	6031.85		6.3	16.2	16.2	12.0	UHSU		Alluvium	T21
63805	2005	03/10/05		2079735	752980	6000.26		6.5	19.4	19.5		UHSU	Qc,Qrf,Qls?	Alluvium	
6386	1986		10/05/04	2085753	748145	5901.09	5902.01	3.8	15.3	15.5	14.8	UHSU	Qls	Alluvium	63-86
6387	1987			2083138	752717	5985.63	5987.01	3.5	25.4	25.5	25.0	UHSU	Qrf	Alluvium	63-87
63893	1993			2081536	747828	5990.72	5991.70	8.0	12.9	12.9		UHSU	Qls	Alluvium	
63895	1995		09/20/02	2079749	752928	6009.51		6.3	16.2	16.2	12.0	UHSU		Alluvium	T22
63993	1993			2081530	747822	5990.97	5992.20	7.8	12.8	12.8		UHSU	Qls	Alluvium	
64093	1993			2081543	747818	5990.84	5991.50	8.0	13.0	13.0		UHSU	Qls	Alluvium	
6474	1974			2084694	752234	5961.15	5963.20	14.0	21.0	30.3	10.3	UHSU		Alluvium/Bedrock	TH-40, 3-3E
6486	1986		05/25/05	2085610	747672	5839.06	5841.05	3.4	9.0	9.0	8.5	UHSU	Qp	Alluvium	64-86
6487	1987			2083261	752329	5986.09	5987.34	13.0	23.3	23.8	22.0	UHSU	Qrf	Alluvium	64-87
6574	1974			2084274	752247	5967.56	5969.61	13.0	23.0	29.4	9.5	UHSU		Alluvium/Bedrock	TH-39, 3-2E
6586	1986		05/26/05	2087501	747881	5786.66	5788.27	2.5	8.0	8.0	7.1	UHSU	Qp	Alluvium	65-86
6587	1987			2083299	752230	5983.48	5984.99	10.7	24.0	24.2	21.0	UHSU	Qrf	Alluvium	65-87
6674	1974			2083792	752089	5974.67	5977.92	1.0	13.0	17.8	10.0	UHSU		Alluvium/Bedrock	TH-37, 3-1E
6686	1986		09/09/04	2091267	746646	5692.57	5694.20	2.5	6.5	6.5	5.8	UHSU	Qp	Alluvium	66-86
6687	1987			2083325	752150	5982.26	5983.67	3.4	18.0	18.2	15.3	UHSU	Qrf	Alluvium	66-87

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Atlas
6774	1974			2080103	750980	6048.23	6050.14	3.0	57.0	58.8	57.7	UHSU		Alluvium	TH-35
6786	1986		08/26/04	2090379	748723	5802.33	5803.97	2.5	14.8	14.8	14.0	UHSU	Qc	Alluvium	67-86
6787	1987			2083774	753164	5970.00	5971.76	11.7	16.5	16.8	16.4	UHSU	Qrf	Alluvium	67-87
68194	1994		03/01/05	2081909	749576	6027.09	6027.10	8.6	18.0	8.6		UHSU		Alluvium	
68394	1994		03/01/05	2082005	749635	6023.25	6023.05	4.2	13.9	4.2		UHSU		Alluvium	
68494	1994		03/01/05	2082026	749552	6024.47	6024.37	5.5	15.2	5.5		UHSU		Alluvium	
6886	1986		07/28/05	2083582	747154	5887.97	5890.49	1.5	3.5	3.5	2.8	UHSU	Qp	Alluvium	68-86
6887	1987		01/28/03	2083776	753145	5968.91	5970.32	11.2	15.8	16.0	15.5	UHSU	Qrf	Alluvium	68-87
6986	1986			2084282	747770	5921.46	5922.52	3.0	14.0	14.0	14.5	UHSU	Qls	Alluvium	69-86
70093	1993		04/20/04	2082657	752675	5990.90	5992.90	7.0	22.0	24.0	22.2	UHSU	Qrf	Alluvium	
70099	1999			2084761	751716	5895.21	5897.15	10.7	20.7	22.0		UHSU		Alluvium/Bedrock	
70193	1993			2082674	752688	5990.00	5992.00	22.3	37.3	39.3	19.5	UHSU	Kcslt,Kslt & Kslts	Bedrock	
70299	1999	08/11/99		2084768	751712	5894.86	5897.18	26.1	36.1	37.5	24.3	UHSU	Kclystn	Bedrock	
70393	1993			2082389	752090	5997.90	6000.10	7.8	22.8	24.8	22.8	UHSU	Qrf	Alluvium	
70493	1993		08/17/05	2082390	752111	5998.00	6000.00	24.0	44.0	46.0	21.3	UHSU	Kslt/clst & Kclst	Bedrock	
70693	1993			2082799	752070	5991.20	5992.70	8.4	28.4	30.5	28.5	UHSU	Qrf	Alluvium	
7086	1986		03/24/05	2082003	747491	5937.69	5939.39	2.4	7.9	7.9	7.0	UHSU	Qp	Alluvium	70-86
7087	1987			2084196	752571	5966.71	5968.38	3.5	16.3	16.5	12.0	UHSU	Qrf	Alluvium/Bedrock	70-87
71102	2002	09/26/02	02/03/05	2084934	751650	5892.27	5893.30	23.8	33.9	34.0	22.0	UHSU	Kclystn,sltyclystn	Bedrock	
71193	1993			2082717	752566	5989.30	5991.30	10.0	20.0	22.0	20.2	UHSU	Qrf/af?	Alluvium	
71202	2002	09/25/02	02/03/05	2084880	751662	5894.31	5895.31	27.0	33.9	34.0	25.3	UHSU	Kclystn,sltyclystn,clyyslstn	Bedrock	
71394	1994			2080265	747027	5983.80	5985.89	5.6	10.6	12.6	10.5	UHSU		Alluvium	
71493	1993			2082741	752517	5990.40	5992.40	18.8	22.8	24.8	24.0	UHSU	af	Alluvium	
71494	1994			2082014	747882	5997.70	5999.80	35.0	40.0	42.0	5.3	UHSU		Bedrock	
71693	1993			2082923	752237	5988.30	5990.30	16.3	26.3	28.3	26.3	UHSU	af	Alluvium	
7187	1987		04/20/04	2084087	753322	5963.89	5965.49	3.5	13.5	13.9	14.0	UHSU	Qrf	Alluvium	71-87
71893	1993			2082951	752174	5987.70	5989.70	10.7	25.7	28.0	26.0	UHSU	Qrf	Alluvium	
72093	1993			2083206	752550	5988.80	6002.77	44.9	49.9	51.9	49.9	UHSU	af	Alluvium	
72293	1993			2083808	752774	5973.70	5976.10	27.6	32.6	34.6	32.7	UHSU	af	Alluvium	
72393	1993			2083196	752552	5992.10	6001.83	26.6	36.6	38.6		UHSU	af	Alluvium	
7287	1987			2083953	752441	5969.60	5971.25	3.5	6.8	7.0	8.0	UHSU	Qrf	Alluvium	72-87
75092	1992		06/09/05	2089870	753228	5723.40	5725.40	7.2	14.7	16.7	6.3	UHSU	Kslt/clst	Bedrock	
75292	1992		06/20/05	2089809	752305	5754.90	5756.90	5.6	7.6	9.6	7.6	UHSU	Qp	Alluvium	
75992	1992		03/22/05	2086628	750290	5897.10	5899.10	5.0	10.0	12.0	10.0	UHSU	Qls	Alluvium	
76292	1992		10/27/04	2085681	750769	5957.00	5959.30	9.2	19.2	21.2	8.5	UHSU	Kcss	Bedrock	
76792	1992		04/20/04	2084618	752546	5943.50	5945.50	3.5	5.5	7.8	6.3	UHSU	Qls	Alluvium	
76992	1992		04/20/04	2084500	752561	5955.00	5958.00	3.4	9.4	11.4	9.6	UHSU	Qrf	Alluvium	
77192	1992		08/23/04	2084381	753646	5913.90	5915.90	2.9	5.9	7.9		UHSU	Qls	Alluvium	
77392	1992		08/11/04	2084299	752243	5962.50	5965.50	3.9	6.9	8.9	7.0	UHSU	Qrf	Alluvium	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
77492	1992		03/14/05	2083508	751246	5942.00	5944.50	12.1	22.1	24.1	22.5	UHSU	Qc	Alluvium	60592
79102	2002	07/30/02		2084441	751053	5967.10	5969.01	6.7	31.7	34.0	6.4	UHSU	Qrf/Ksltyclystn,clystn,sltyss,clyysltstn	Alluvium/Bedrock	
79202	2002	07/30/02		2084643	751036	5969.26	5971.26	7.7	32.7	35.0	2.8	UHSU	Kclyysltstn,sltyclystn,clystn,sltstn,ss	Bedrock	
79302	2002	07/30/02		2085090	751067	5958.57	5960.57	7.8	27.8	30.0	4.8	UHSU	Kclystn,sltstn	Bedrock	
79402	2002	07/30/02		2085274	750927	5960.25	5962.25	5.8	15.8	18.0	6.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
79502	2002	07/30/02		2085240	750338	5968.94	5970.94	6.8	21.8	24.0	8.0	UHSU	Qrf/Ksltstn,sltyclystn,clystn	Alluvium/Bedrock	
79605	2005	04/05/05		2085325	750671	5962.69	5964.67	5.8	25.8	26.0	4.0	UHSU	Kclystn	Bedrock	
83101	2001	10/10/01	05/16/05	2083945	748718	5999.46	5999.02	6.4	21.4	21.5	13.5	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
83201	2001	10/09/01	02/07/05	2083947	748857	5997.52	5997.04	4.0	19.9	20.0	8.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84002	2002	02/21/02		2082819	748560	6018.16	6017.79	7.7	27.9	28.0	24.2	UHSU	Qrf/Kclystn,ss	Alluvium/Bedrock	
84102	2002	02/14/02	02/08/05	2083204	748522	6011.95	6011.48	7.8	24.7	24.8	16.2	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84202	2002	02/12/02	02/08/05	2083489	748889	6006.51	6006.16	7.0	23.9	24.0	18.3	UHSU	Qrf/Kclystn,sltstn	Alluvium/Bedrock	
84302	2002	02/07/02	02/07/05	2083439	749205	6001.32	6001.07	6.4	18.4	18.5	12.4	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84402	2002	02/04/02	02/08/05	2083307	749435	6003.94	6003.58	8.4	23.4	23.5	17.5	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84502	2002	02/06/02	02/08/05	2083496	749553	5998.04	5997.70	7.9	22.9	23.0	12.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84602	2002	01/31/02	01/26/05	2082888	749612	6010.32	6009.96	9.8	26.4	26.5	20.5	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
84702	2002	01/25/02	10/26/04	2082659	749784	6012.26	6011.78	10.0	26.9	27.0	20.8	UHSU	Qrf/Kclystn,sltyclystn	Alluvium/Bedrock	
84802	2002	01/24/02	02/09/05	2082484	749679	6014.76	6014.45	7.9	29.7	29.8	25.2	UHSU	Qrf/Ksltstn, clystn	Alluvium/Bedrock	
84902	2002	01/21/02	02/09/05	2082059	749821	6020.41	6020.05	8.0	29.9	30.0	24.7	UHSU	Qrf/Kclystn,clyysltstn	Alluvium/Bedrock	
85002	2002	01/29/02	03/22/05	2082847	750101	6007.18	6006.89	9.5	31.4	31.5	25.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
85102	2002	01/15/02	02/09/05	2082434	749382	6017.54	6017.04	9.8	31.9	32.0	26.0	UHSU	Qrf/Kclystn,sltstn,ss	Alluvium/Bedrock	
85202	2002	02/19/02	03/15/05	2082735	749231	6013.92	6013.48	6.3	28.4	28.5	24.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
85302	2002	02/27/02	02/09/05	2082017	749206	6025.18	6024.73	11.8	33.9	34.0	24.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
86501	2001	10/17/01	02/21/05	2083972	749067	5996.68	5996.24	4.3	23.9	24.0	8.2	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
86601	2001	10/18/01	02/07/05	2084088	749211	5992.03	5991.62	4.3	23.9	24.0	9.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
86701	2001	10/08/01	02/21/05	2084115	748934	5992.85	5992.43	4.1	19.9	20.0	11.8	UHSU	Qrf/Ksltyclystn	Alluvium/Bedrock	
88101	2001	10/23/01	06/09/04	2084009	748123	5965.52	5964.86	6.9	30.4	30.5	7.6	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
88104	2004	01/11/05		2084063	748028	5959.69	5962.09	4.8	29.8	30.0	5.1	UHSU	Kclystn,sltyclystn	Bedrock	
89104	2004	01/06/05		2085013	747641	5855.92	5858.21	4.8	19.8	20.0	6.3	UHSU	Qc,Qvf?/Kclystn,sltyclystn	Alluvium/Bedrock	
90099	1999	07/27/99	06/21/05	2086557	748154	5853.35	5855.82	11.9	16.9	19.3	16.3	UHSU		Alluvium/Bedrock	
90299	1999	07/29/99		2086902	748043	5823.13	5825.22	8.2	18.2	20.5	18.0	UHSU		Alluvium/Bedrock	
90399	1999	07/28/99		2086539	748025	5838.23	5840.63	8.7	18.7	21.0	4.5	UHSU		Alluvium/Bedrock	
90402	2002	08/01/02		2086112	748794	5951.60	5953.60	7.7	17.7	20.0	13.7	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
90502	2002	08/01/02	06/28/05	2085472	749108	5978.57	5980.57	5.8	15.8	18.0	12.8	UHSU	Qrf/Ksltstn	Alluvium/Bedrock	
90603	2003	12/12/03	06/13/05	2086341	748668	5930.56	5931.96	5.4	25.4	25.5	7.9	UHSU	Qc/Kclystn,sltyclystn	Alluvium/Bedrock	
90703	2003	11/04/03		2086696	748558	5904.51	5906.01	5.3	23.9	24.0	8.0	UHSU	Qc/Kclysltstn,clystn	Alluvium/Bedrock	
90804	2004	01/13/05		2086391	748302	5892.41	5895.09	19.8	49.8	50.0	39.5	UHSU	Qc,Qrf/Kclystn,sltyss,sndysltstn,sltyclystn	Alluvium/Bedrock	
91103	2003	09/25/03	09/08/04	2085960	749638	5956.12	5957.52	3.4	18.4	18.5	1.0	UHSU	Kss,sltyclystn,sndysltstn	Bedrock	
91104	2004	06/07/04	01/26/05	2085961	749628	5956.37		4.5	19.5	19.6		UHSU		Bedrock	

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
91203	2003	09/24/03		2085910	749919	5937.76	5939.76	4.4	19.4	19.5	4.6	UHSU	Qrf,af?/Kclystn,sltstn,ss,sltyclstn	Alluvium/Bedrock	
91305	2005	04/18/05		2085823	749915	5929.51	5931.52	5.4	30.4	30.7	16.0	UHSU	Qaf,Qc,Ksltstn,Kclystn	Alluvium/Bedrock	
92399	1999		10/05/04	2087075	748060	5814.00	5814.75	9.2	14.0	14.3	11.0	UHSU		Alluvium/Bedrock	
95099	1999	09/23/99		2088014	750717	5861.07	5863.32	16.0	21.0	23.0	21.0	UHSU	Qrf	Alluvium	
95199	1999	09/23/99		2087282	750524	5878.86	5881.90	17.0	22.0	24.0	22.0	UHSU	Qrf	Alluvium	
95503	2003	01/14/04	06/15/05	2087546	750243	5934.93	5936.53	4.2	34.9	35.0	5.2	UHSU	Qrf,Qc/Kclyst,sndysltstn,sltyss,ss,sltyclstn	Alluvium/Bedrock	
99101	2001	11/05/01	11/09/04	2085273	749895	5942.50	5941.99	5.3	20.4	20.5	9.0	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
99201	2001	11/02/01	11/09/04	2085476	750021	5951.98	5951.50	4.5	29.6	29.7	9.8	UHSU	Qrf/Kclystn,sltyclystn	Alluvium/Bedrock	
99301	2001	10/30/01	11/09/04	2085631	749975	5933.85	5933.42	4.7	29.9	30.0	8.2	UHSU	Qrf/Kclystn	Alluvium/Bedrock	
99305	2005	04/07/05		2085633	749978	5937.44	5939.54	6.3	26.3	26.5	13.6	UHSU	Qc,Qaf?,Kclystn	Alluvium/Bedrock	
99401	2001	07/25/01	11/09/04	2085586	749862	5930.77	5930.36	4.8	21.4	21.5	4.4	UHSU	Qrf/Kclystn,sltyclystn	Alluvium/Bedrock	
99405	2005	04/13/05		2085585	749863	5932.37	5935.16	5.3	25.3	25.5	5.6	UHSU	Qc,Kclystn,Kclystn w/slt	Bedrock	
99603	2003	12/17/03	04/05/04	2085351	749790	5931.89	5931.59	3.4	18.4	18.5	2.0	UHSU	Kclystn,sltstn	Bedrock	
B102289	1989	04/25/89	10/08/02	2079512	753091	5978.30	5980.06	3.0	12.5	14.2	12.5	UHSU	Qp	Alluvium	1889
B102389	1989	04/25/89	10/08/02	2080256	753834	5939.50	5941.18	3.7	10.9	12.6	10.4	UHSU	Qls	Alluvium	1989
B106089	1989	10/13/89		2082580	752310	5993.30	5995.35	3.7	23.2	24.5	22.5	UHSU	Qrf	Alluvium	LF0189
B110889	1989	10/10/89	10/04/04	2079273	749346	6075.60	6077.77	45.3	64.8	65.8	65.0	UHSU	Qrf	Alluvium	SF0489
B110989	1989	10/11/89	10/04/04	2078778	749795	6082.30	6084.36	46.1	65.6	66.9	71.0	UHSU	Qrf	Alluvium	SF0589
B111189	1989	10/05/89	09/17/02	2077580	749645	6105.70	6107.52	53.1	72.6	73.8		UHSU	Qrf	Alluvium	SF0689
B200589	1989	06/07/89		2083536	754837	5968.40	5970.17	11.9	31.6	33.3	30.5	UHSU	Qrf	Alluvium	589
B200689	1989	06/07/89	01/30/03	2084158	755238	5960.10	5961.94	11.6	31.1	32.8	30.5	UHSU	Qrf	Alluvium	689
B200789	1989	03/08/89	01/29/03	2085008	755765	5946.10	5948.08	9.1	28.5	30.5	28.0	UHSU	Qrf	Alluvium	789
B200889	1989	06/05/89		2085702	756186	5936.10	5938.08	8.6	23.1	24.7	22.7	UHSU	Qrf	Alluvium	0889
B201089	1989	03/09/89	02/04/03	2087257	755267	5883.10	5885.15	3.5	7.8	9.6	7.5	UHSU	Qls	Alluvium	989
B201189	1989	05/05/89	10/08/02	2086852	757645	5806.50	5808.41	20.4	34.8	36.5	34.0	UHSU	Qls	Alluvium	1089, BH1189
B201289	1989	03/23/89		2083582	757596	5826.10	5827.80	14.7	23.9	26.1	23.4	UHSU	Qls	Alluvium	1189, BH1289
B201589	1989	03/16/89	10/07/02	2086648	757328	5846.00	5847.68	4.4	8.8	10.5	3.6	UHSU	Kcss	Bedrock	1389, BH1489
B202489	1989	04/24/89	10/07/02	2083894	757395	5770.90	5772.83	3.4	12.9	14.7	12.4	UHSU	Qp	Alluvium	2089
B202589	1989	04/26/89	10/07/02	2085712	758112	5723.60	5725.45	4.5	11.6	13.4	12.8	UHSU	Qp	Alluvium	2189
B203189	1989	02/20/89	02/17/03	2083557	754848	5968.00	5970.12	35.3	44.7	46.5	29.8	UHSU	Kclst & Kscist	Bedrock	2789BR, 2789
B203289	1989	06/19/89	01/30/03	2084177	755240	5959.70	5961.59	35.0	44.5	46.0	30.1	UHSU	Kclst & Kscist	Bedrock	2889BR, 2889
B203489	1989	01/27/89	01/30/03	2085052	755791	5945.70	5947.71	31.0	40.5	41.3	28.6	UHSU	Kclst	Bedrock	2989BR, 2989
B203589	1989	02/27/89	02/17/03	2085744	756209	5935.20	5937.07	29.7	39.2	40.9	31.1	UHSU	Qrf & Kscist & Kclst	Alluvium/Bedrock	3089BR, 3089
B205589	1989	03/21/89	10/08/02	2086855	757654	5806.40	5808.46	6.9	16.9	18.0	32.3	UHSU	Qls	Alluvium	4689, BH11-89
B206189	1989	03/15/89		2083301	752332	5984.50	5986.57	25.9	35.4	36.6	20.9	UHSU	Kclst	Bedrock	LF0289BR, LF0289
B206289	1989	09/28/89		2083564	752253	5977.59	5979.49	32.4	41.8	43.1	15.0	UHSU	Ksltclst & Kclst	Bedrock	LF0389BR, LF0389
B206389	1989	05/19/89		2083926	752548	5969.70	5971.56	4.0	13.5	14.7	13.3	UHSU	Qrf	Alluvium	LF0489BR, LF0489
B206489	1989	05/03/89		2083964	752427	5969.14	5971.46	3.3	10.0	11.4	7.3	UHSU	Qrf & Ksltclst	Alluvium/Bedrock	LF0589, B106489
B206589	1989	05/05/89		2084121	752458	5967.80	5969.72	23.5	35.1	36.2	7.6	UHSU	Kclst	Bedrock	LF0689BR, LF0689

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
B206689	1989	04/28/89	04/20/04	2084361	752588	5959.31	5961.20	8.7	18.2	19.4	3.7	UHSU	Kslt\clst	Bedrock	LF0889BR, LF0889
B206789	1989	05/23/89		2084161	752818	5927.90	5930.19	9.8	19.3	20.5	4.8	UHSU	Kclst	Bedrock	LF0989BR, LFO989, B206789
B206889	1989	04/27/89	04/20/04	2084781	752823	5917.09	5919.15	8.0	17.5	18.2	3.0	UHSU	Kslt\clst	Bedrock	LF1089BR, LF1089
B206989	1989	09/18/89		2084835	753145	5882.42	5884.32	11.8	21.3	22.5	6.0	UHSU	Kscl\st	Bedrock	LF1189BR, LF1189, P206989
B208089	1989	04/17/89	08/11/04	2085876	751143	5935.40	5937.07	3.4	12.9	14.2	12.2	UHSU	Qls	Alluvium	SEP0889
B208189	1989	04/18/89	06/20/05	2085885	751138	5935.40	5937.46	16.9	26.3	27.6	11.0	UHSU	Kclst	Bedrock	SEP0989BR, SEP0989
B208289	1989	04/14/89	06/09/05	2086289	751739	5850.70	5852.95	6.0	15.4	16.2	0.2	UHSU	Kslt\clst & Kclst	Bedrock	SEP1089
B208589	1989	04/19/89	10/26/04	2085477	751804	5856.50	5858.35	3.2	4.0	5.1	3.6	UHSU	Qp	Alluvium	SEP1389
B208689	1989	08/29/89	10/20/04	2085250	751728	5867.60	5869.60	12.3	21.8	23.1	7.3	UHSU	Kslt\clst	Bedrock	SEP1489BR, SEP1489
B208789	1989	04/24/89	10/19/04	2084450	751755	5907.10	5909.03	2.9	10.9	12.3	8.4	UHSU	Qls	Alluvium	SEP1589, P208789
B210389	1989	08/30/89	10/20/04	2085116	751696	5873.20	5875.32	13.6	23.1	24.4	8.6	UHSU	Kslt\clst	Bedrock	SEP3289BR, SEP3289
B210489	1989	08/28/89		2085513	751802	5856.40	5858.71	3.0	7.4	8.7	7.0	UHSU	Qp	Alluvium	Sep-89
B218789	1989	01/18/90	10/19/04	2086720	749425	5962.80	5964.52	9.1	28.5	29.8	28.0	UHSU	Qrf	Alluvium	P218789, 6489
B302089	1989	10/16/89	02/21/03	2083490	746786	5907.60	5909.55	3.9	13.3	15.0	13.5	UHSU	Qls	Alluvium	1689
B302789	1989	04/26/89	03/07/03	2086227	744707	5832.30	5834.17	4.0	8.6	10.2	8.0	UHSU	Qt	Alluvium	2389
B302889	1989	10/11/89	03/07/03	2089525	745827	5730.80	5733.16	5.9	10.5	12.1	12.2	UHSU	Qt	Alluvium	2489
B302989	1989	04/27/89	03/07/03	2091266	745356	5686.20	5688.15	3.5	7.9	9.7	7.4	UHSU	Qp	Alluvium	2589
B303089	1989	11/02/89		2093994	742278	5601.20	5602.93	4.6	7.0	8.9	4.6	UHSU	Kclst	Alluvium/Bedrock	2689
B304789	1989	10/12/89	02/21/03	2085299	747309	5867.80	5869.56	27.9	37.6	39.1	22.9	UHSU	Kclst	Bedrock	3989BR, 3989
B304889	1989	09/06/89	03/07/03	2089570	745817	5730.60	5732.56	14.7	24.1	25.9	9.2	UHSU	Kclst	Bedrock	4089BR, 4089
B305389	1989		03/07/03	2086232	744718	5831.90	5833.90	15.2	24.6	26.3	10.0	UHSU	Kslt\clst & Kcslt	Bedrock	4489BR, 4489, B405389
B400089	1989	06/28/89	08/29/02	2078309	744565	6121.80	6123.76	28.6	38.0	38.3	48.5	UHSU	Qrf	Alluvium	0189P
B400189	1989	06/14/89	08/29/02	2078309	744565	6122.20	6124.15	10.1	49.6	51.4	52.5	UHSU	Qrf	Alluvium	0189A
B400289	1989	06/14/89	08/29/02	2079142	744645	6106.00	6107.71	20.5	50.0	51.3		UHSU	Qrf	Alluvium	289
B400389	1989	06/14/89	09/02/04	2078395	743760	6122.00	6124.00	9.5	49.0	50.3	48.5	UHSU	Qrf	Alluvium	389
B400489	1989	06/15/89	08/29/02	2079205	743821	6105.01	6107.07	9.9	54.5	55.7	54.0	UHSU	Qrf	Alluvium	0489, BH0489
B401989	1989	04/05/89	03/11/03	2081635	745849	6025.60	6027.67	6.6	21.0	22.7	20.5	UHSU	Qp	Alluvium	1589
B402189	1989	06/05/89	02/21/03	2081476	746339	6024.50	6026.49	13.5	22.9	24.6	7.5	UHSU	Kss	Bedrock	1789BR, 1789
B402689	1989	03/08/89	03/21/05	2078262	747229	6045.40	6047.07	2.6	3.3	5.9	2.8	UHSU	Qp	Alluvium	2289
B405189	1989	03/29/89	03/11/03	2082448	746782	5968.10	5969.91	13.2	22.7	24.5	8.2	UHSU	Kslt\clst	Bedrock	4289BR, 4289
B405489	1989	05/05/89	09/02/04	2078357	745191	6115.90	6117.67	39.1	48.6	50.1	34.0	UHSU	Kslt\clst & Kclst	Bedrock	4589BR, 4589
B405689	1989	05/18/89	07/24/02	2079190	743819	6105.30	6107.25	3.0	22.5	23.8		UHSU	Qrf	Alluvium	4789
B405789	1989	06/15/89	08/29/02	2079220	743821	6104.80	6106.70	43.0	52.5	53.7	52.0	UHSU	Qrf	Alluvium	4889
B405889	1989	06/14/89	02/21/03	2081476	746332	6024.90	6026.87	36.0	45.5	46.8	6.5	UHSU	Kss	Bedrock	4989BR, 4989
B405989	1989	04/06/89	02/21/03	2081477	746349	6023.60	6026.06	2.8	6.7	8.5	6.1	UHSU	Qls	Alluvium	5089
B410589	1989	10/12/89	09/17/02	2077811	747771	6111.80	6113.80	40.6	60.0	61.3		UHSU	Qrf	Alluvium	B310589, SF0189
B410689	1989	10/11/89	10/04/04	2078729	748350	6091.70	6093.71	30.5	50.1	51.3		UHSU	Qrf	Alluvium	SF0289
B410789	1989	10/05/89	11/17/04	2079141	748791	6082.10	6083.66	25.5	45.0	46.3		UHSU	Qrf	Alluvium	SF0389
B411289	1989	10/06/89	07/22/02	2076943	748718	6125.40	6127.30	48.9	68.4	69.7		UHSU	Qrf	Alluvium	SF0789

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
B411389	1989	10/06/89	07/16/02	2077713	748728	6109.50	6111.06	44.0	63.5	64.8		UHSU	Qrf	Alluvium	SF0889
P114389	1989	01/15/90		2081739	750990	5991.20	5993.17	10.1	14.5	15.8	14.0	UHSU	Qrf	Alluvium	PZ3589
P114489	1989	09/15/89	05/25/04	2081246	750337	6033.40	6035.43	44.4	48.8	50.1	48.3	UHSU	Qrf	Alluvium	PZ3689
P114589	1989	06/29/89	07/22/02	2081731	750396	6024.10	6025.90	32.5	36.5	37.6	27.5	UHSU		Bedrock	PZ3789
P114689	1989	01/15/90		2083044	749943	6004.00	6005.76	17.8	22.2	23.5	22.0	UHSU	Qrf	Alluvium	P214689, PZ4289
P114789	1989	01/15/90	02/23/05	2082610	749940	6010.70	6012.40	21.8	26.2	27.7	26.0	UHSU	Qrf	Alluvium	PZ4389
P114889	1989	09/22/89	05/09/05	2082127	749926	6016.60	6018.26	9.9	14.3	15.6	13.8	UHSU	Qrf	Alluvium	PZ4489
P114989	1989	09/15/89	05/25/04	2081661	749959	6029.80	6031.84	33.6	38.0	39.3	37.5	UHSU	Qrf	Alluvium	PZ4589
P115089	1989	01/15/90	05/25/04	2081258	749930	6038.10	6040.10	36.3	40.7	42.0	40.2	UHSU	Qrf	Alluvium	PZ4689
P115489	1989	01/15/90	03/14/05	2082135	749507	6023.40	6025.10	22.1	26.5	27.8	26.0	UHSU	Qrf	Alluvium	PZ4989
P115589	1989	01/15/90		2082658	749551	6014.10	6015.77	25.1	29.5	30.7	29.0	UHSU	Qrf	Alluvium	PZ5089
P115689	1989	09/15/89	03/28/05	2083019	749532	6006.90	6008.71	16.2	20.2	21.3	19.7	UHSU	Qrf	Alluvium	PZ5189
P119389	1989	12/04/89	03/15/05	2081921	750280	6011.70	6013.18	12.5	16.9	18.2	16.4	UHSU	Qrf	Alluvium	PZ3889
P207389	1989	06/05/89	12/14/04	2084468	750195	5981.02	5982.77	10.5	15.2	16.3	7.0	UHSU	Kss & Kcls t	Bedrock	B207389, SEP0189BR, SEP0189
P207489	1989	06/06/89		2084481	750197	5980.71	5982.64	2.4	7.0	8.2	6.5	UHSU	Qrf	Alluvium	SEP0289
P207589	1989	09/21/89	10/26/04	2084843	750395	5974.06	5975.96	14.4	23.9	25.1	9.4	UHSU	Kslt clst	Bedrock	SEP0389
P207689	1989	09/14/89	05/03/04	2085318	750398	5966.32	5967.88	3.6	13.1	14.4	12.6	UHSU	Qrf	Alluvium	SEP0489
P207789	1989	05/05/89	10/26/04	2085343	750392	5965.88	5967.75	17.9	27.3	28.6	12.9	UHSU	Kslt clst	Bedrock	SEP0589
P207889	1989	09/15/89	05/03/04	2085343	750671	5962.82	5964.90	3.3	7.7	9.0	8.5	UHSU	Qrf	Alluvium	SEP0689
P207989	1989	09/14/89	03/21/05	2085330	750671	5963.09	5965.17	11.0	20.5	21.7	5.8	UHSU	Kclst	Bedrock	SEP0789BR, SEP0789
P208989	1989	09/28/89		2084839	751044	5962.53	5964.56	15.4	24.8	26.1	3.5	UHSU	Kslt ss & Kslt clst	Bedrock	SEP1789BR, SEP1789
P209089	1989	05/17/89	09/12/02	2084910	750566	5972.16	5974.25	16.5	26.0	27.2	11.5	UHSU	Kslt clst	Bedrock	SEP1889BR, SEP1889
P209189	1989	09/27/89	09/15/04	2084309	750762	5980.66	5982.21	13.3	35.0	36.1	10.3	UHSU	Kss & Kslt clst	Bedrock	SEP1989BR, SEP1889
P209289	1989	06/08/89	04/27/04	2084139	750863	5981.59	5983.42	8.2	12.7	13.4	12.2	UHSU	Qrf	Alluvium	SEP2089
P209389	1989	06/07/89	03/28/05	2084130	750864	5981.47	5983.39	16.8	28.8	30.1	13.8	UHSU	Kss & Kslt ss & Kcss	Bedrock	SEP2189BR, SEP2189
P209489	1989	09/20/89	09/12/02	2084634	750991	5977.98	5980.10	15.5	35.0	36.3	9.0	UHSU	Kss & Kslt ss	Bedrock	SEP2289BR, SEP2289
P209589	1989	05/10/89	08/11/04	2085286	751071	5948.17	5950.04	9.1	18.5	19.8	4.1	UHSU	Kslt clst & Kscls t	Bedrock	SEP2389BR, SEP2389
P209689	1989	09/21/89	05/03/04	2085514	750533	5962.63	5964.43	17.2	26.7	27.9	12.2	UHSU	Kslt clst	Bedrock	SEP2489BR, SEP2489
P209789	1989	09/13/89	05/03/04	2085481	750579	5962.82	5964.94	3.0	12.5	13.8	12.0	UHSU	Qrf	Alluvium	SEP2589
P209889	1989	09/26/89	02/24/05	2084984	751194	5940.28	5942.40	8.9	18.3	19.6	3.9	UHSU	Kslt clst	Bedrock	SEP2689BR, SEP2689
P210089	1989	09/05/89		2084639	751564	5898.40	5900.40	12.2	21.5	22.9	7.2	UHSU	Kslt clst	Bedrock	SEP2989BR, SEP2989
P210189	1989	09/28/89		2084411	750752	5980.82	5982.48	20.4	36.1	37.1	14.6	UHSU	Kslt ss & Kscls t	Bedrock	SEP3089BR, SEP3089
P210289	1989	05/15/89		2085223	750564	5967.03	5969.19	11.6	21.0	22.3	6.6	UHSU	Kslt clst	Bedrock	SEP3189BR, SEP3189
P213689	1989	10/16/89	02/24/05	2083736	749460	5994.30	5996.04	9.1	13.5	14.8	13.0	UHSU	Qrf	Alluvium	PZ1089
P215789	1989	01/15/90	02/22/05	2083430	749470	6002.00	6003.66	14.5	18.5	19.6	18.0	UHSU	Qrf	Alluvium	P115789, PZ5289
P218089	1989	11/01/89	12/10/04	2084020	749941	5985.80	5987.55	3.0	7.4	8.7	6.0	UHSU	Qrf	Alluvium	OP0389
P218289	1989		05/26/04	2082653	748952	6016.90	6018.20	9.5	23.5	24.7	23.0	UHSU	Qrf	Alluvium	P418289, OP0189
P218389	1989	11/08/89	03/17/05	2085648	750831	5956.20	5958.45	8.1	12.5	13.8	12.0	UHSU	Qrf	Alluvium	PZ2789
P219089	1989	12/12/89	03/24/04	2084117	751127	5949.10	5949.90	5.0	14.4	15.7	10.4	UHSU	Qc, Kclst & Kslt clst	Alluvium/Bedrock	BH7740689

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostraugraphic Unit	Completion Lithology	Completion Formation	Alias
P219189	1989	11/30/89	08/26/04	2084010	751222	5941.20	5943.15	7.1	11.5	12.8	11.0	UHSU	Qc	Alluvium	PZ1889
P219489	1989	12/06/89	03/14/05	2085651	750415	5959.50	5961.15	18.5	22.9	24.2	22.5	UHSU	Qrf	Alluvium	PZ1589
P219589	1989	12/07/89	10/20/04	2085536	750268	5963.80	5965.70	21.3	25.7	27.0	17.2	UHSU	Kclst & Kscist	Bedrock	PZ1289
P313489	1989	10/11/89	05/26/04	2083062	748913	6011.70	6013.58	16.7	21.1	22.4	20.6	UHSU	Qrf	Alluvium	PZ0589, P318489
P313589	1989	10/12/89	05/26/04	2083547	748510	6008.50	6010.11	8.1	12.5	13.8	11.0	UHSU	Qrf	Alluvium	P213589, PZ0789
P314089	1989	10/16/89	05/26/04	2083653	749461	5996.70	5998.49	5.4	9.8	11.1	9.3	UHSU	Qrf	Alluvium	P214089, PZ2389
P314289	1989	10/11/89	05/26/04	2083280	748216	6010.10	6011.77	9.1	13.5	14.8	13.0	UHSU	Qrf	Alluvium	PZ3189
P317989	1989	11/02/89	05/26/04	2084272	748891	5990.90	5992.84	3.0	7.5	8.7	6.4	UHSU	Qrf	Alluvium	OP0389
P320089	1989	02/06/90	05/26/04	2083280	748799	6009.90	6011.87	14.4	18.8	20.1	18.8	UHSU	Qrf	Alluvium	P220089, 7089
P414189	1989	10/12/89	02/22/05	2082986	749059	6010.60	6012.18	14.1	18.5	19.8	18.0	UHSU	Qrf	Alluvium	P214189, PZ2489
P415889	1989	09/15/89	03/14/05	2080718	749125	6050.40	6052.60	38.8	43.2	44.5	49.5	UHSU	Qrf	Alluvium	PZ5389
P415989	1989	01/16/90	08/23/04	2081011	749025	6044.90	6046.71	22.3	26.7	28.0	34.0	UHSU	Qrf	Alluvium	PZ5489
P416089	1989	09/15/89	06/01/04	2080720	748605	6051.70	6053.95	29.2	34.0	35.4	33.5	UHSU	Qrf	Alluvium	PZ5589
P416189	1989	01/16/90	03/28/05	2081120	748606	6045.60	6047.95	25.2	29.7	30.9	29.2	UHSU	Qrf	Alluvium	PZ5689
P416289	1989	01/16/90	03/28/05	2081555	748598	6038.60	6040.22	19.1	23.5	24.8	23.0	UHSU	Qrf	Alluvium	PZ5789
P416389	1989	09/15/89	06/01/04	2080631	748313	6055.40	6057.14	25.7	30.1	31.4	30.0	UHSU	Qrf	Alluvium	PZ5889
P416489	1989	09/06/89	06/01/04	2081113	748210	6048.50	6050.15	21.3	25.7	27.0	25.2	UHSU	Qrf	Alluvium	PZ5989
P416589	1989	01/16/90		2081546	748211	6041.20	6042.81	27.0	31.0	32.1	30.5	UHSU	Qrf	Alluvium	PZ6089
P416689	1989	09/18/89	03/28/05	2081941	748147	6035.00	6036.55	28.1	32.5	33.8	32.0	UHSU	Qrf	Alluvium	B416689, PZ6189
P416789	1989	01/16/90	03/28/05	2082382	748206	6027.80	6029.27	22.5	26.9	28.2	26.4	UHSU	Qrf	Alluvium	PZ6289
P416889	1989	09/19/89		2082815	748206	6017.40	6018.79	15.9	20.3	21.5	20.2	UHSU	Qrf	Alluvium	PZ6389
P419689	1989	01/18/90		2082513	748522	6022.40	6023.42	19.1	23.5	24.8	22.0	UHSU	Qrf & Kss	Alluvium/Bedrock	PZ0489
TH046592	1992			2087164	750596	5885.54	5888.14	6.0	18.5	19.0	25.0	UHSU	af	Alluvium	
TH046792	1992			2087216	750566	5871.38	5873.96	6.5	14.0	16.0	14.0	UHSU	af	Alluvium	
TH046992	1992			2087890	750817	5856.55	5858.95	10.0	25.0	27.0	25.0	UHSU	af	Alluvium	
TH047092	1992			2087914	750842	5841.58	5844.17	6.0	11.0	13.0	11.0	UHSU	af	Alluvium	
WS01	1974			2082511	752538	5993.52	5994.55			24.6		UHSU	Qrf	Alluvium?	
WS02	1974			2084198	752582	5966.01	5965.75			14.5		UHSU	af	Alluvium?	
0387	1987			2083962	747706	5930.58	5932.44	102.8	107.8	108.0	20.8	LHSU	Kssit & Kcslt	Bedrock	0387BR, 03-87BR
0886	1986			2084001	752817	5925.60	5926.90	59.1	63.8	63.8	1.0	LHSU	Kssit	Bedrock	08-86
0887	1987			2084294	747758	5919.95	5921.55	84.0	89.0	89.3	8.7	LHSU	Kshclst & Kclst	Bedrock	0887BR, 08-87BR
0986	1986		12/11/03	2082472	752191	5996.39	5998.23	122.6	135.4	135.4	30.3	LHSU	Kss & Kssit	Bedrock	09-86
1687	1987		07/26/02	2086249	749130	5969.49	5970.79	100.0	125.0	125.2	22.2	LHSU	Kslt	Bedrock	1687BR, 6-87BR
1887	1987		12/04/03	2086339	749404	5967.99	5969.49	127.0	133:5	133.7	25.2	LHSU	Kss & Kssit	Bedrock	1887BR, 18-87BR
2087	1987		12/02/03	2086155	749634	5968.66	5970.14	107.3	116.1	116.4	11.8	LHSU	Kshclst	Bedrock	2087BR, 20-87BR
2174	1974			2082636	748290	6026.60	6026.75	155.0	255.0	258.0	25.0	LHSU		Bedrock	21-74
22093	1993		03/02/04	2085973	748623	5945.00	5947.43	48.0	63.0	66.3	8.8	LHSU	Kclst,Kcslt,Kslss	Bedrock	
22193	1993		02/19/04	2086763	749084	5960.90	5963.36	49.6	56.4	59.7	8.5	LHSU	Kscist,Kcss & Kclst	Bedrock	
22293	1993		12/02/03	2086501	748373	5881.50	5884.12	67.0	82.0	85.0	21.0	LHSU	Kscist,Kslst,Kcss,Kshcls	Bedrock	

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Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
22393	1993		12/02/03	2086121	749564	5969.30	5972.14	108.2	118.0	121.3	12.7	LHSU	Kcslst & Kclst	Bedrock	
22593	1993		01/28/04	2087315	750008	5947.60	5950.20	85.0	95.0	98.0		LHSU	Qrf	Bedrock	
2274	1974			2087126	749525	5956.80	5957.50	124.0	276.0	199.0	27.0	LHSU		Bedrock	22-74
2287	1987		12/02/03	2085822	749924	5931.18	5932.80	81.4	88.5	88.7	12.8	LHSU	Kss & Kslt	Bedrock	2287BR, 22-87BR
23193	1993		01/28/04	2087319	749999	5948.20	5950.46	66.8	73.8	77.0	8.0	LHSU	Kss,Ksltss,Kcss	Bedrock	
23293	1993		01/28/04	2086846	749823	5955.60	5958.02	77.9	87.7	91.0	22.2	LHSU	Kclst,Kcslt	Bedrock	
2386	1986			2084259	750338	5982.46	5982.46	113.0	117.3	117.3	8.2	LHSU	Kslt & Ksltclst	Bedrock	23-86
2586	1986		12/03/03	2084831	750412	5975.24	5977.14	59.9	82.0	82.0	8.0	LHSU	Ksltclst & Kclst	Bedrock	25-86
2786	1986		08/13/02	2085238	750781	5962.89	5963.88	128.5	133.0	133.0	11.0	LHSU	Ksslts & Kscslst	Bedrock	27-86
2887	1987		02/17/04	2088090	749438	5947.56	5949.90	187.4	197.4	197.7	43.5	LHSU	Kslt & Kclst	Bedrock	2887BR, 28-87BR
3087	1987		12/02/03	2087424	748090	5810.12	5811.77	85.8	94.4	94.4	16.0	LHSU	Kcslt	Bedrock	3087BR, 30-87BR
3187	1987		02/18/04	2088309	749500	5945.31	5947.46	110.7	129.4	129.6	45.0	LHSU	Qrf	Bedrock	3187BR, 31-87BR
3286	1986		12/03/03	2084743	751050	5966.08	5967.92	114.9	125.5	125.5	1.0	LHSU	Kss & Ksltss	Bedrock	32-86
3487	1987		02/02/04	2087931	749836	5945.60	5947.22	97.3	104.2	104.5	20.0	LHSU	Ksltclst & Kslt	Bedrock	3487BR, 34-87BR
3987	1987		12/03/03	2085268	751081	5946.95	5948.42	110.0	117.1	117.4	3.5	LHSU	Kssslt & Kclst	Bedrock	SP08-87, 39-87BR
4086	1986		02/18/04	2088505	749611	5943.85	5944.89	88.0	111.5	111.5	45.0	LHSU	Kclst	Bedrock	40-86
4187	1987		01/22/04	2084821	753118	5882.95	5884.49	81.2	93.8	94.0	3.5	LHSU	Ksltss	Bedrock	4187BR, 41-87BR
4587	1987		01/29/04	2085451	748313	5949.32	5950.91	89.5	97.1	101.3	4.0	LHSU	Kss & Kslt & Kclst	Bedrock	4587BR, 45-87BR, BH59-87
46692	1992	07/24/92	01/26/04	2087077	749554	5956.20	5958.25	72.0	87.0	89.8	24.5	LHSU	Ksltss, Kssslt & Kclst	Bedrock	
46792	1992	07/24/92	01/26/04	2087080	749538	5956.30	5958.44	96.8	111.8	114.6	24.5	LHSU	Kssslt, Kcslt & Kslt	Bedrock	
4686	1986		09/10/02	2078283	750854	6081.99	6083.99	140.3	160.8	160.8	90.0	LHSU	Kslt & Kcslt	Bedrock	46-86
46892	1992	09/14/92	01/26/04	2087087	749524	5956.70	5958.56	146.9	161.9	164.7	24.5	LHSU	Ksltss, Kssslt & Kclst	Bedrock	
4886	1986		09/09/02	2078287	748989	6097.14	6099.10	192.0	207.1	207.1	70.0	LHSU	Kssslt & Kcslt	Bedrock	48-86
53094	1994		01/23/04	2085095	753198	5872.94	5873.37	55.0	65.0	67.0	14.0	LHSU		Bedrock	
5486	1986		12/01/03	2078339	745257	6116.48	6117.62	75.4	85.2	85.3	36.0	LHSU	Kssslt & Kslt	Bedrock	54-86
57594	1994		02/25/04	2082153	747591	5946.20	5948.43	79.9	89.9	92.2	16.5	LHSU		Bedrock	
59394	1994		02/19/04	2082699	747725	5965.30	5966.96	77.5	87.5	89.5	14.0	LHSU		Bedrock	
59894	1994		02/25/04	2080724	747728	6025.70	6028.34	105.1	120.1	122.1	11.9	LHSU		Bedrock	
70293	1993		12/11/03	2082665	752681	5993.10	5995.10	52.1	67.1	69.1	21.5	LHSU	Kss,Kslst & Kssltst	Bedrock	
70593	1993		12/11/03	2082390	752100	5998.00	6000.00	121.0	136.0	138.0	21.3	LHSU	Kslts	Bedrock	
70893	1993		01/20/04	2082810	752070	5991.20	5993.20	51.0	66.0	68.0	25.6	LHSU	Kslst & Kcslst	Bedrock	
B203789	1989	06/27/89	11/24/03	2085031	755777	5946.20	5948.28	134.2	138.6	140.8	28.7	LHSU	Kcslt & Kclst	Bedrock	3289BR, 3289
B203889	1989	06/29/89	11/24/03	2085721	756198	5935.80	5937.69	107.0	111.4	113.9	28.5	LHSU	Kclst	Bedrock	3389BR, 3389
B203989	1989	06/16/89	11/24/03	2086552	756730	5920.90	5922.78	126.0	130.4	132.7	22.7	LHSU	Kslts & Kslt	Bedrock	3489BR, 3489
B204089	1989	07/06/89	11/26/03	2087317	754897	5877.60	5879.29	106.5	112.9	115.2	1.2	LHSU	Kslts	Bedrock	3589BR, 3589
B204189	1989	06/27/89	11/26/03	2088469	755340	5826.90	5828.86	81.1	95.3	97.6	3.5	LHSU	Kcss, Kslts & Kscslst	Bedrock	3689BR, 3689
B207089	1989	04/24/89	01/23/04	2084837	753103	5883.07	5884.95	31.3	53.0	54.0	6.0	LHSU	Kscslst & Ksltclst	Bedrock	LF1289BR, LF1289
B207189	1989	06/13/89		2084837	753092	5884.80	5886.72	71.0	75.4	77.8	5.5	LHSU	Ksltclst & Kclst	Bedrock	LF1389BR, LF1389
B217289	1989	09/28/89	11/26/03	2093776	750563	5677.60	5679.10	109.8	134.1	136.4	5.1	LHSU	Kss, Kslts, Kcslt	Bedrock	5489BR

Table 4.2
Summary of Monitoring Well Completion Details

Well Number	Year	Installation Date	Abandonment Date	Easting	Northing	Ground Surface Elevation (ft msl)	Top of Casing Elevation (ft msl)	Top of Screen (ft bgl)	Bottom of Screen (ft bgl)	Total Depth of Casing (ft bgl)	Top of Bedrock (ft bgl)	Hydrostratigraphic Unit	Completion Lithology	Completion Formation	Alias
B217489	1989	10/12/89	01/26/04	2086818	749454	5961.20	5963.23	142.0	146.4	148.7	25.2	LHSU	Kss	Bedrock	5689BR
B217589	1989	10/25/89	01/28/04	2087189	749817	5952.90	5954.89	85.2	90.7	92.9	17.3	LHSU	Kss & Kshcist	Bedrock	5789BR
B217689	1989	11/07/89	01/19/04	2086745	749629	5960.53	5961.82	98.5	102.9	105.1	22.0	LHSU	Kclss	Bedrock	P217689, 5889BR
B217789	1989	11/30/89	02/02/04	2087341	749494	5954.90	5956.85	72.0	83.8	86.0	23.6	LHSU	Kshcist	Bedrock	6089BR
B304289	1989	02/06/90		2086215	744679	5833.00	5838.18	84.0	88.5	91.0	10.5	LHSU	Kss & Kslt & Kclst	Bedrock	3789BR, 3789
B304989	1989	09/18/89	12/01/03	2089600	745801	5729.70	5731.85	75.5	83.9	86.3	8.4	LHSU	Kslss & Kssh	Bedrock	4189BR, 4189
B405289	1989	04/04/89	12/01/03	2082465	746798	5965.70	5967.31	41.2	45.7	48.0	8.6	LHSU	Kscist & Kshcist	Bedrock	4389BR, 4389
P208889	1989	06/23/89	12/03/03	2085249	751086	5947.30	5949.25	87.8	96.9	99.2	5.5	LHSU	Kshcist	Bedrock	SEP1689BR, SEP1689
P416989	1989	08/25/89	01/20/04	2081034	748780	6045.20	6047.55	151.2	155.6	158.0	30.0	LHSU	Kssh & Kslt	Bedrock	5189BR

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Table 4.3
UHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
										99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
DIOXIN	T	2378-TCDD	1746-01-6	71	0	0.00	0.012	U	UG/L	-----	-----	-----	-----	Yes	1.00E-05	5.00E-09	1.00E-05	0	0.00	Yes	0.00003	0.00003	0	0.00	Yes	No	-----	No
DIOXIN	T	Tetrachlorodibenzo-p-dioxin	41903-57-5	71	0	0.00	0.012	U	UG/L	-----	-----	-----	-----	Yes	1.00E-05	5.00E-09	1.00E-05	0	0.00	Yes	0.00003	0.00003	0	0.00	Yes	No	-----	No
FUNG	T	Pentachlorobenzene	608-93-5	65	0	0.00	10	U	UG/L	-----	-----	-----	-----	Yes	10	1.4	10	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
HERB	T	2,4,5-TP (Silvex)	93-72-1	88	2	2.27	0.51		UG/L	-----	-----	-----	-----	Yes	5	10	10	0	0.00	No	50	50	0	0.00	No	No	-----	No
HERB	T	2,4-D	94-75-7	88	2	2.27	3.6		UG/L	-----	-----	-----	-----	Yes	1	70	70	0	0.00	No	70	70	0	0.00	No	No	-----	No
HERB	T	Acrolein	107-02-8	15	0	0.00	500	U	UG/L	-----	-----	-----	-----	Yes	10	3.5	10	0	0.00	Yes	-----	-----	-----	-----	-----	No	-----	No
HERB	T	Dalapon	75-99-0	6	2	33.33	17		UG/L	-----	-----	-----	-----	Yes	13	200	200	0	0.00	No	200	200	0	0.00	No	No	-----	No
HERB	T	Dinoseb	88-85-7	62	2	3.23	0.8		UG/L	-----	-----	-----	-----	Yes	2	7	7	0	0.00	No	7	7	0	0.00	No	No	-----	No
MET	T	Boron	7440-42-8	8	5	62.50	133	N	UG/L	-----	-----	-----	-----	Yes	30	750	750	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
MET	T	Chromium VI	18540-29-9	6	1	16.67	11		UG/L	-----	-----	-----	-----	Yes	20	50	50	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
MET	T	Cobalt	7440-48-4	2062	862	41.80	2100	B	UG/L	-----	-----	-----	-----	Yes	50	-----	-----	0	0.00	-----	2190	2190	0	0.00	No	No	-----	No
MET	T	Tin	7440-31-5	2023	274	13.54	642		UG/L	116	18	0.89	Yes	Yes	200	-----	-----	0	0.00	-----	21900	21900	0	0.00	No	No	-----	No
PCB	T	PCB-1016	12674-11-2	492	1	0.20	0	I	UG/L	-----	-----	-----	-----	Yes	1	6.40E-05	1	0	0.00	No	0.5	1	0	0.00	No	No	-----	No
PCB	T	PCB-1221	11104-28-2	492	1	0.20	0	I	UG/L	-----	-----	-----	-----	Yes	1	6.40E-05	1	0	0.00	No	0.5	1	0	0.00	No	No	-----	No
PCB	T	PCB-1248	12672-29-6	497	1	0.20	0	I	UG/L	-----	-----	-----	-----	Yes	1	6.40E-05	1	0	0.00	No	0.5	1	0	0.00	No	No	-----	No
PCB	T	PCB-1260	11096-82-5	497	0	0.00	250	U	UG/L	-----	-----	-----	-----	Yes	1	6.40E-05	1	0	0.00	Yes	0.5	1	0	0.00	Yes	No	-----	No
PEST	T	4,4'-DDD	72-54-8	457	1	0.22	0.033	JP	UG/L	-----	-----	-----	-----	Yes	0.1	3.10E-04	0.1	0	0.00	No	0.355	0.355	0	0.00	No	No	-----	No
PEST	T	4,4'-DDE	72-55-9	457	1	0.22	0.025	J	UG/L	-----	-----	-----	-----	Yes	0.1	2.20E-04	0.1	0	0.00	No	0.25	0.25	0	0.00	No	No	-----	No
PEST	T	Aldrin	309-00-2	457	1	0.22	0	I	UG/L	-----	-----	-----	-----	Yes	0.1	4.90E-05	0.1	0	0.00	No	0.00501	0.1	0	0.00	No	No	-----	No
PEST	T	alpha-Chlordane	5103-71-9	409	0	0.00	1.1	U	UG/L	-----	-----	-----	-----	Yes	1	8.00E-04	1	0	0.00	Yes	2	2	0	0.00	No	No	-----	No
PEST	T	beta-Chlordane	5103-74-2	399	0	0.00	1.1	U	UG/L	-----	-----	-----	-----	Yes	1	8.00E-04	1	0	0.00	Yes	2	2	0	0.00	No	No	-----	No
PEST	T	Chlordane (NOS)	57-74-9	48	0	0.00	0.14	U	UG/L	-----	-----	-----	-----	Yes	1	8.00E-04	1	0	0.00	No	2	2	0	0.00	No	No	-----	No
PEST	T	Endosulfan I	959-98-8	456	0	0.00	0.14	U	UG/L	-----	-----	-----	-----	Yes	0.1	0.06	0.1	0	0.00	Yes	219	219	0	0.00	No	No	-----	No
PEST	T	Endosulfan II	33213-65-9	457	0	0.00	0.22	U	UG/L	-----	-----	-----	-----	Yes	0.1	0.06	0.1	0	0.00	Yes	219	219	0	0.00	No	No	-----	No
PEST	T	Endosulfan sulfate	1031-07-8	457	1	0.22	0	I	UG/L	-----	-----	-----	-----	Yes	0.1	0.06	0.1	0	0.00	No	219	219	0	0.00	No	No	-----	No
PEST	T	Endrin	72-20-8	457	0	0.00	0.22	U	UG/L	-----	-----	-----	-----	Yes	0.1	0.04	0.1	0	0.00	Yes	2	2	0	0.00	No	No	-----	No
PEST	T	gamma-BHC (Lindane)	58-89-9	456	2	0.44	0.04		UG/L	-----	-----	-----	-----	Yes	0.05	0.08	0.08	0	0.00	No	0.2	0.2	0	0.00	No	No	-----	No
PEST	T	gamma-Chlordane	12789-03-6	10	0	0.00	0.52	U	UG/L	-----	-----	-----	-----	Yes	1	8.00E-04	1	0	0.00	No	2	2	0	0.00	No	No	-----	No
PEST	T	Heptachlor	76-44-8	457	1	0.22	0	I	UG/L	-----	-----	-----	-----	Yes	0.05	7.80E-05	0.05	0	0.00	No	0.4	0.4	0	0.00	No	No	-----	No
PEST	T	Methoxychlor	72-43-5	457	0	0.00	1.8	U	UG/L	-----	-----	-----	-----	Yes	0.5	0.03	0.5	0	0.00	Yes	40	40	0	0.00	No	No	-----	No
PEST	T	Parathion	56-38-2	68	0	0.00	10	U	UG/L	-----	-----	-----	-----	Yes	10	0.01	10	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
PEST	T	Toxaphene	8001-35-2	457	0	0.00	5.4	U	UG/L	-----	-----	-----	-----	Yes	3	2.00E-04	3	0	0.00	Yes	3	3	0	0.00	Yes	No	-----	No
RAD	T	Cesium-134	13967-70-9	41	41	100.00	1.487	J	PCI/L	-----	-----	-----	-----	Yes	10	80	80	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
RAD	T	Cesium-137	10045-97-3	638	631	98.90	4.499		PCI/L	1.0	14	2.19	Yes	Yes	10	-----	-----	0	0.00	-----	1.51	10	0	0.00	No	No	-----	No
RAD	T	Curium-244	13981-15-2	17	17	100.00	0.004245		PCI/L	-----	-----	-----	-----	Yes	-----	60	60	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
RAD	T	Neptunium-237	13994-20-2	97	10	10.31	0.55	J	PCI/L	-----	-----	-----	-----	Yes	-----	30	30	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
RAD	T	Strontium-90	10098-97-2	1	0	0.00	0.537	U	PCI/L	1.2	0	0.00	No	Yes	1	8	8	0	0.00	No	0.852	1	0	0.00	No	No	-----	No
SVOC	T	1,2,4,5-Tetrachlorobenzene	95-94-3	65	0	0.00	10	U	UG/L	-----	-----	-----	-----	Yes	10	0.97	10	0	0.00	No	-----	-----	-----	-----	-----	No	-----	No
SVOC	T	2,4,5-Trichlorophenol	95-95-4	630	1	0.16	3	J	UG/L	-----	-----	-----	-----	Yes	10	700	700	0	0.00	No	50	50	0	0.00	No	No	-----	No
SVOC	T	2,4,6-Trichlorophenol	88-06-2	630	0	0.00	100	U	UG/L	-----	-----	-----	-----	Yes	50	1.4	50	0	0.00	Yes	7.74	50	0	0.00	Yes	No	-----	No
SVOC	T	2,4-Dichlorophenol	120-83-2	630	0	0.00	100	U	UG/L	-----	-----	-----	-----	Yes	50	21	50	0	0.00	Yes	110	110	0	0.00	No	No	-----	No
SVOC	T	2,4-Dimethylphenol	105-67-9	630	9	1.43	19		UG/L	-----	-----	-----	-----	Yes	50	140	140	0	0.00	No	730	730	0	0.00	No	No	-----	No
SVOC	T	2,4-Dinitrophenol	51-28-5	604	0	0.00	500	U	UG/L	-----	-----	-----	-----	Yes	50	14	50	0	0.00	Yes	73	73	0	0.00	Yes	No	-----	No
SVOC	T	2,4-Dinitrotoluene	121-14-2	633	0	0.00	100	U	UG/L	-----	-----	-----	-----	Yes	10	0.11	10	0	0.00	Yes	0.125	10	0	0.00	Yes	No	-----	No
SVOC	T	2,6-Dinitrotoluene	606-20-2	633	1	0.16	2	J	UG/L	-----	-----	-----	-----	Yes	10	230	230	0	0.00	No	0.125	10	0	0.00	No	No	-----	No
SVOC	T	2-Chloronaphthalene	91-58-7	633	1	0.16	5	J	UG/L	-----	-----	-----	-----	Yes	10	560	560	0	0.00	No	2920	2920	0	0.00	No	No	-----	No
SVOC	T	2-Chlorophenol	95-57-8	630	0	0.00	100	U	UG/L	-----	-----	-----	-----	Yes	50	35	50	0	0.00	Yes	183	183	0	0.00	No	No	-----	No
SVOC	T	2-Methylnaphthalene	91-57-6	633	11	1.74	100		UG/L	-----	-----	-----	-----	Yes	10	-----	-----	0	0.00	-----	1460	1460	0	0.00	No	No	-----	No
SVOC	T	2-Methylphenol	95-48-7	618	5	0.81	14		UG/L	-----	-----	-----	-----	Yes	10	1830	1830	0	0.00	No	1830	1830	0	0.00	No	No	-----	No
SVOC	T	2-Nitroaniline	88-74-4	633	0	0.00	500	U	UG/L	-----	-----	-----	-----	Yes	50	-----	-----	0	0.00	-----	2.19	50	0	0.00	Yes	No	-----	No

Table 4.3
UHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
										99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
SVOC	T	3 & 4-methyl phenol	----	3	1	33.33	7	J	UG/L	----	----	----	----	Yes	10	1830	1830	0	0.00	No	1830	1830	0	0.00	No	No	----	No
SVOC	T	3,3'-Dichlorobenzidine	91-94-1	586	0	0.00	200	U	UG/L	----	----	----	----	Yes	10	0.021	10	0	0.00	Yes	0.189	10	0	0.00	Yes	No	----	No
SVOC	T	4,6-Dinitro-2-methylphenol	534-52-1	630	0	0.00	500	U	UG/L	----	----	----	----	Yes	50	0.27	50	0	0.00	Yes	3.65	50	0	0.00	Yes	No	----	No
SVOC	T	4-Chloro-3-methylphenol	59-50-7	630	0	0.00	100	U	UG/L	----	----	----	----	Yes	50	30	50	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	4-Chloroaniline	106-47-8	604	1	0.17	4	J	UG/L	----	----	----	----	Yes	20	----	----	0	0.00	----	146	146	0	0.00	No	No	----	No
SVOC	T	Acenaphthene	83-32-9	633	18	2.84	24		UG/L	----	----	----	----	Yes	10	420	420	0	0.00	No	2190	2190	0	0.00	No	No	----	No
SVOC	T	Acenaphthylene	208-96-8	633	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	0.0028	10	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	Aniline	62-53-3	53	0	0.00	500	U	UG/L	----	----	----	----	Yes	10	6.1	10	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	Anthracene	120-12-7	633	2	0.32	15	J	UG/L	----	----	----	----	Yes	10	2100	2100	0	0.00	No	11000	11000	0	0.00	No	No	----	No
SVOC	T	Aramite	140-57-8	9	0	0.00	200	U	UG/L	----	----	----	----	Yes	20	1.4	20	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	Aramite I	140-57-8	7	0	0.00	20	U	UG/L	----	----	----	----	Yes	20	1.4	20	0	0.00	No	----	----	----	----	----	No	----	No
SVOC	T	Atamite II	140-57-8	11	0	0.00	20	U	UG/L	----	----	----	----	Yes	20	1.4	20	0	0.00	No	----	----	----	----	----	No	----	No
SVOC	T	Benzoic Acid	65-85-0	375	21	5.60	2900	E	UG/L	----	----	----	----	Yes	50	----	----	0	0.00	----	146000	146000	0	0.00	No	No	----	No
SVOC	T	Benzyl Alcohol	100-51-6	452	0	0.00	100	U	UG/L	----	----	----	----	Yes	20	----	----	0	0.00	----	11000	11000	0	0.00	No	No	----	No
SVOC	T	bis(2-Chloroethyl) ether	111-44-4	621	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	0.03	10	0	0.00	Yes	0.0774	10	0	0.00	Yes	No	----	No
SVOC	T	bis(2-Chloroisopropyl) ether	108-60-1	608	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	280	280	0	0.00	No	1.22	10	0	0.00	Yes	No	----	No
SVOC	T	Butylbenzylphthalate	85-68-7	633	12	1.90	4	J	UG/L	----	----	----	----	Yes	10	1400	1400	0	0.00	No	7300	7300	0	0.00	No	No	----	No
SVOC	T	Dibenz(a,h)anthracene	53-70-3	633	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	0.0038	10	0	0.00	Yes	0.0117	10	0	0.00	Yes	No	----	No
SVOC	T	Dibenzofuran	132-64-9	633	4	0.63	15	J	UG/L	----	----	----	----	Yes	10	----	----	0	0.00	----	146	146	0	0.00	No	No	----	No
SVOC	T	Diethylphthalate	84-66-2	633	69	10.90	310		UG/L	----	----	----	----	Yes	10	5600	5600	0	0.00	No	29200	29200	0	0.00	No	No	----	No
SVOC	T	Dimethylphthalate	131-11-3	633	1	0.16	2	J	UG/L	----	----	----	----	Yes	10	70000	70000	0	0.00	No	365000	365000	0	0.00	No	No	----	No
SVOC	T	Di-n-butylphthalate	84-74-2	633	70	11.06	5	BJ	UG/L	----	----	----	----	Yes	10	700	700	0	0.00	No	3650	3650	0	0.00	No	No	----	No
SVOC	T	Di-n-octylphthalate	117-84-0	633	23	3.63	86		UG/L	----	----	----	----	Yes	10	----	----	0	0.00	----	730	730	0	0.00	No	No	----	No
SVOC	T	Endrin aldehyde	7421-93-4	166	0	0.00	0.23	U	UG/L	----	----	----	----	Yes	0.1	0.29	0.29	0	0.00	No	----	----	----	----	----	No	----	No
SVOC	T	Fluoranthene	206-44-0	632	12	1.90	53		UG/L	----	----	----	----	Yes	10	130	130	0	0.00	No	1460	1460	0	0.00	No	No	----	No
SVOC	T	Fluorene	86-73-7	633	14	2.21	15	J	UG/L	----	----	----	----	Yes	10	280	280	0	0.00	No	1460	1460	0	0.00	No	No	----	No
SVOC	T	Hexachlorobenzene	118-74-1	633	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	2.80E-04	10	0	0.00	Yes	1	10	0	0.00	Yes	No	----	No
SVOC	T	Hexachlorocyclopentadiene	77-47-4	627	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	5	10	0	0.00	Yes	50	50	0	0.00	Yes	No	----	No
SVOC	T	Indeno(1,2,3-cd)pyrene	193-39-5	633	1	0.16	10	J	UG/L	----	----	----	----	Yes	10	3.80E-03	10	0	0.00	No	0.117	10	0	0.00	No	No	----	No
SVOC	T	Isophorone	78-59-1	633	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	36	36	0	0.00	Yes	89.6	89.6	0	0.00	Yes	No	----	No
SVOC	T	Nitrobenzene	98-95-3	633	0	0.00	100	U	UG/L	----	----	----	----	Yes	10	3.5	10	0	0.00	Yes	18.3	18.3	0	0.00	Yes	No	----	No
SVOC	T	N-Nitrosodiethylamine	55-18-5	65	0	0.00	20	U	UG/L	----	----	----	----	Yes	10	2.30E-04	10	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	N-Nitrosodimethylamine	62-75-9	56	0	0.00	10	U	UG/L	----	----	----	----	Yes	10	6.90E-04	10	0	0.00	No	----	----	----	----	----	No	----	No
SVOC	T	N-Nitrosodi-n-butylamine	924-16-3	59	0	0.00	10	U	UG/L	----	----	----	----	Yes	10	4.30E-03	10	0	0.00	No	----	----	----	----	----	No	----	No
SVOC	T	N-Nitrosomethylethylamine	10595-95-6	65	0	0.00	10	U	UG/L	----	----	----	----	Yes	----	1.60E-03	0.0016	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	N-Nitrosopyrrolidine	930-55-2	65	0	0.00	50	U	UG/L	----	----	----	----	Yes	10	0.016	10	0	0.00	Yes	----	----	----	----	----	No	----	No
SVOC	T	Phenol	108-95-2	630	9	1.43	130		UG/L	----	----	----	----	Yes	50	2100	2100	0	0.00	No	21900	21900	0	0.00	No	No	----	No
SVOC	T	Pyrene	129-00-0	633	12	1.90	51		UG/L	----	----	----	----	Yes	10	210	210	0	0.00	No	1100	1100	0	0.00	No	No	----	No
VOC	T	1,1-Dichloroethane	75-34-3	7475	813	10.88	780	E	UG/L	----	----	----	----	Yes	1	3650	3650	0	0.00	No	3650	3650	0	0.00	No	No	----	No
VOC	T	1,2-Dichlorobenzene	95-50-1	5887	25	0.42	8		UG/L	----	----	----	----	Yes	10	420	420	0	0.00	No	600	600	0	0.00	No	No	----	No
VOC	T	1,3-Dichlorobenzene	541-73-1	5886	42	0.71	31	J	UG/L	----	----	----	----	Yes	10	94	94	0	0.00	No	600	600	0	0.00	No	No	----	No
VOC	T	1,4-Dioxane	123-91-1	1	0	0.00	20	U	UG/L	----	----	----	----	Yes	100	6.1	100	0	0.00	No	----	----	----	----	----	No	----	No
VOC	T	2-Butanone	78-93-3	2906	50	1.72	5860	D	UG/L	----	----	----	----	Yes	10	21900	21900	0	0.00	No	21900	21900	0	0.00	No	No	----	No
VOC	T	4-Methyl-2-pentanone	108-10-1	3662	22	0.60	1500	DJ	UG/L	----	----	----	----	Yes	10	2920	2920	0	0.00	No	2920	2920	0	0.00	No	No	----	No
VOC	T	Acrylonitrile	107-13-1	62	0	0.00	50000	U	UG/L	----	----	----	----	Yes	5	0.051	5	0	0.00	Yes	----	----	----	----	----	No	----	No
VOC	T	Carbon Disulfide	75-15-0	3697	82	2.22	361		UG/L	----	----	----	----	Yes	1	3650	3650	0	0.00	No	3650	3650	0	0.00	No	No	----	No
VOC	T	Ethylbenzene	100-41-4	7473	82	1.10	430	E	UG/L	----	----	----	----	Yes	10	530	530	0	0.00	No	700	700	0	0.00	No	No	----	No
VOC	T	m,p-Xylene	----	1607	23	1.43	140		UG/L	----	----	----	----	Yes	5	1400	1400	0	0.00	No	10000	10000	0	0.00	No	No	----	No
VOC	T	m-Xylene	108-38-3	128	3	2.34	0.2		UG/L	----	----	----	----	Yes	5	1400	1400	0	0.00	No	10000	10000	0	0.00	No	No	----	No
VOC	T	o-Xylene	95-47-6	1744	21	1.20	38	J	UG/L	----	----	----	----	Yes	5	1400	1400	0	0.00	No	10000	10000	0	0.00	No	No	----	No

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Table 4.3
UHSU Groundwater AOI Screening

										AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	
Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	Is Constituent an AOI?
VOC	T	p-Xylene	106-42-3	121	3	2.48	0.2		UG/L	-----	----	----	----	Yes	5	1400	1400	0	0.00	No	10000	10000	0	0.00	No	No	-----	No
VOC	T	Styrene	100-42-5	7462	24	0.32	14	J	UG/L	-----	-----	-----	----	Yes	5	100	100	0	0.00	No	100	100	0	0.00	No	No	-----	No
VOC	T	Vinyl acetate	108-05-4	1586	3	0.19	2	J	UG/L	-----	----	-----	-----	Yes	5	-----	----	0	0.00	-----	36500	36500	0	0.00	No	No	-----	No
VOC	T	Xylene	1330-20-7	5748	94	1.64	1000	E	UG/L	-----	----	----	----	Yes	5	1400	1400	0	0.00	No	10000	10000	0	0.00	No	No	-----	No
MET	T	Lithium	7439-93-2	2048	1594	77.83	6170	B	UG/L	147	204	9.96	Yes	Yes	100	-----	----	0	0.00	-----	730	730	24	1.17	Yes	No	-----	No
MET	T	Molybdenum	7439-98-7	2050	549	26.78	3660	B	UG/L	116	26	1.27	Yes	Yes	30	-----	-----	0	0.00	-----	183	183	12	0.59	Yes	No	-----	No
MET	T	Strontium	7440-24-6	2047	2011	98.24	74100		UG/L	944	478	23.35	Yes	Yes	200	-----	-----	0	0.00	----	21900	21900	5	0.24	Yes	No	-----	No
MET	T	Vanadium	7440-62-2	2068	1318	63.73	4100		UG/L	47	319	15.43	Yes	Yes	40	-----	-----	0	0.00	----	256	256	60	2.90	Yes	No	-----	No
RAD	T	Strontium-89/90	-----	418	225	53.83	5.332		PCI/L	1.2	25	5.98	Yes	Yes	1	8	8	0	0.00	No	0.852	1	28	6.70	Yes	No	-----	No
RAD	D	Uranium	-----	1029	531	51.60	774.3551		PCI/L	114	53	5.15	Yes	Yes	0.685	2442	2442	0	0.00	No	20.56	20.56	215	20.89	Yes	No	-----	No
RAD	D	Uranium Isotopes	-----	4671	4671	100.00	1265		PCI/L	114	127	2.72	Yes	Yes	0.685	2442	2442	0	0.00	No	20.56	20.56	903	19.33	Yes	No	-----	No
SVOC	T	4-Methylphenol	106-44-5	581	20	3.44	2100	D	UG/L	-----	-----	-----	----	Yes	10	-----	-----	0	0.00	----	183	183	2	0.34	Yes	No	-----	No
MET	T	Arsenic	7440-38-2	2019	843	41.75	430		UG/L	5.9	237	11.74	Yes	Yes	5	50	50	20	0.99	Yes	50	50	20	0.99	Yes	No	-----	No
MET	D	Cadmium	7440-43-9	4697	1035	22.04	98.2		UG/L	4.7	52	1.11	Yes	Yes	5	1.5	5	43	0.92	Yes	5	5	43	0.92	Yes	No	-----	No
MET	D	Chromium	7440-47-3	4895	1016	20.76	649		UG/L	14	143	2.92	Yes	Yes	2	99.3	99.3	15	0.31	Yes	100	100	15	0.31	Yes	No	-----	No
MET	D	Lead	-----	4668	434	9.30	80.7		UG/L	13	5	0.11	Yes	Yes	10	3.7	10	10	0.21	Yes	15	15	3	0.06	Yes	No	-----	No
MET	D	Mercury	7439-97-6	4627	267	5.77	5.5		UG/L		0	0.00	Yes	Yes	1	1.4	1.4	10	0.22	Yes	2	2	5	0.11	Yes	No	-----	No
MET	D	Silver	7440-22-4	4656	215	4.62	217		UG/L	7.8	19	0.41	Yes	Yes	5	0.59	5	36	0.77	Yes	183	183	1	0.02	Yes	No	-----	No
MET	T	Silver	7440-22-4	2068	210	10.15	3040		UG/L	----	----	----	----	Yes	5	100	100	9	0.44	Yes	183	183	7	0.34	Yes	No	-----	No
MET	D	Thallium	7440-28-0	4640	347	7.48	45.3		UG/L	5.4	139	3.00	Yes	Yes	12	0.5	12	27	0.58	Yes	2	12	27	0.58	Yes	No	-----	No
MET	T	Thallium	7440-28-0	2061	180	8.73	89.1		UG/L	5.8	38	1.84	Yes	Yes	12	0.5	12	9	0.44	Yes	2	12	9	0.44	Yes	No	-----	No
MET	T	Zinc	7440-66-6	2103	1494	71.04	686000		UG/L	153	264	12.55	Yes	Yes	20	2000	2000	16	0.76	Yes	11000	11000	6	0.29	Yes	No	-----	No
PCB	T	PCB-1232	11141-16-5	492	4	0.81	11		UG/L	-----	-----	-----	----	Yes	1	6.40E-05	1	2	0.41	Yes	0.5	1	2	0.41	Yes	No	-----	No
PCB	T	PCB-1242	53469-21-9	497	2	0.40	11		UG/L	-----	-----	-----	----	Yes	1	6.40E-05	1	2	0.40	Yes	0.5	1	2	0.40	Yes	No	-----	No
PEST	T	4,4'-DDT	50-29-3	457	2	0.44	1.8	I	UG/L	-----	-----	----	----	Yes	0.1	2.20E-04	0.1	1	0.22	Yes	0.25	0.25	1	0.22	Yes	No	-----	No
PEST	T	alpha-BHC	319-84-6	457	5	1.09	0.12		UG/L	-----	-----	-----	----	Yes	0.05	2.60E-03	0.05	2	0.44	Yes	0.2	0.2	0	0.00	No	No	-----	No
PEST	T	beta-BHC	319-85-7	457	3	0.66	0.055	X	UG/L	----	----	-----	-----	Yes	0.05	9.10E-03	0.05	1	0.22	Yes	0.2	0.2	0	0.00	No	No	-----	No
PEST	T	Dieldrin	60-57-1	457	4	0.88	0.24	X	UG/L	-----	-----	-----	----	Yes	0.1	5.20E-05	0.1	3	0.66	Yes	0.00532	0.1	3	0.66	Yes	No	-----	No
PEST	T	Heptachlor epoxide	1024-57-3	457	2	0.44	0.13	X	UG/L	-----	-----	----	----	Yes	0.05	3.90E-05	0.05	2	0.44	Yes	0.2	0.2	0	0.00	No	No	-----	No
RAD	T	Uranium-235	15117-96-1	1059	670	63.27	120	B	PCI/L	5.2	21	1.98	Yes	Yes	1	10	10	8	0.76	Yes	1.01	1.01	122	11.52	Yes	No	-----	No
SVOC	T	4-Nitrophenol	100-02-7	627	1	0.16	61	DJ	UG/L	-----	-----	-----	-----	Yes	50	56	56	1	0.16	Yes	292	292	0	0.00	No	No	-----	No
SVOC	T	Benzo(a)anthracene	56-55-3	633	3	0.47	24		UG/L	-----	-----	-----	----	Yes	10	3.80E-03	10	1	0.16	Yes	0.117	10	1	0.16	Yes	No	-----	No
SVOC	T	Benzo(a)pyrene	50-32-8	633	2	0.32	22		UG/L	-----	----	----	----	Yes	0.2	3.80E-03	0.2	2	0.32	Yes	0.2	0.2	2	0.32	Yes	No	-----	No
SVOC	T	Benzo(b)fluoranthene	205-99-2	633	2	0.32	19		UG/L	----	-----	-----	-----	Yes	10	3.80E-03	10	1	0.16	Yes	0.117	10	1	0.16	Yes	No	-----	No
SVOC	T	Benzo(g,h,i)perylene	191-24-2	633	1	0.16	12	J	UG/L	-----	-----	-----	----	Yes	10	3.80E-03	10	1	0.16	Yes	-----	-----	-----	----	No	No	-----	No
SVOC	T	Benzo(k)fluoranthene	207-08-9	633	1	0.16	13	J	UG/L	-----	-----	-----	----	Yes	10	3.80E-03	10	1	0.16	Yes	1.17	10	1	0.16	Yes	No	-----	No
SVOC	T	Chrysene	218-01-9	633	3	0.47	28		UG/L	-----	----	----	-----	Yes	10	3.80E-03	10	1	0.16	Yes	11.7	11.7	1	0.16	Yes	No	-----	No
SVOC	T	N-Nitroso-di-n-propylamine	621-64-7	633	1	0.16	200	D	UG/L	----	----	-----	----	Yes	10	0.005	10	1	0.16	Yes	0.0122	10	1	0.16	Yes	No	-----	No
SVOC	T	Pentachlorophenol	87-86-5	630	3	0.48	62	DJ	UG/L	-----	----	----	----	Yes	50	0.27	50	1	0.16	Yes	1	50	1	0.16	Yes	No	-----	No
SVOC	T	Phenanthrene	85-01-8	633	21	3.32	71		UG/L	-----	----	----	----	Yes	10	2.80E-03	10	2	0.32	Yes	-----	-----	-----	----	No	No	-----	No
VOC	T	1,1,1-Trichloroethane	71-55-6	7463	1051	14.08	22200	D	UG/L	----	----	-----	-----	Yes	5	200	200	46	0.62	Yes	200	200	46	0.62	Yes	No	-----	No
VOC	T	1,1,2,2-Tetrachloroethane	79-34-5	7468	19	0.25	23		UG/L	-----	-----	-----	----	Yes	1	0.17	1	12	0.16	Yes	0.426	1	12	0.16	Yes	No	-----	No
VOC	T	1,1,2-Trichloroethane	79-00-5	7469	102	1.37	72		UG/L	-----	-----	----	----	Yes	1	2.7	2.7	33	0.44	Yes	5	5	23	0.31	Yes	No	-----	No
VOC	T	1,2,4-Trichlorobenzene	120-82-1	5880	86	1.46	80	E	UG/L	----	-----	-----	-----	Yes	10	35	35	11	0.19	Yes	70	70	2	0.03	Yes	No	-----	No
VOC	T	1,2-Dibromoethane	106-93-4	5591	9	0.16	25	DF	UG/L	-----	-----	-----	----	Yes	1	4.10E-04	1	9	0.16	Yes	0.05	1	9	0.16	Yes	No	-----	No
VOC	T	1,2-Dichloroethane	107-06-2	7401	151	2.04	1100		UG/L	----	----	----	----	Yes	1	0.38	1	72	0.97	Yes	5	5	41	0.55	Yes	Yes	-----	Yes
VOC	T	1,2-Dichloropropane	78-87-5	7471	84	1.12	200	E	UG/L	-----	-----	-----	----	Yes	1	0.5	1	41	0.55	Yes	5	5	4	0.05	Yes	No	-----	No
VOC	T	1,4-Dichlorobenzene	106-46-7	5886	58	0.99	240		UG/L	-----	----	----	----	Yes	10	63	63	7	0.12	Yes	75	75	7	0.12	Yes	No	-----	No
VOC	T	Acetone	67-64-1	3458	282	8.16	15000	BD	UG/L	----	----	-----	-----	Yes	10	3650	3650	2	0.06	Yes	3650	3650	2	0.06	Yes	No	-----	No
VOC	T	Benzene	71-43-2	7478	193	2.58	950		UG/L	----	-----	-----	-----	Yes	1	2.2	2.2	48	0.64	Yes	5	5	30	0.40	Yes	Yes	-----	Yes

Table 4.3
UHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
										99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
VOC	T	Bromodichloromethane	75-27-4	7458	73	0.98	540	J	UG/L	-----	-----	-----	-----	Yes	1	0.55	1	34	0.46	Yes	80	80	2	0.03	Yes	No	-----	No
VOC	T	Bromoform	75-25-2	7415	19	0.26	25	DF	UG/L	-----	-----	-----	-----	Yes	1	4.3	4.3	8	0.11	Yes	80	80	0	0.00	No	No	-----	No
VOC	T	Bromomethane	74-83-9	7323	16	0.22	110	J	UG/L	-----	-----	-----	-----	Yes	1	9.8	9.8	11	0.15	Yes	51.1	51.1	1	0.01	Yes	No	-----	No
VOC	T	Chlorobenzene	108-90-7	7472	59	0.79	3300		UG/L	-----	-----	-----	-----	Yes	5	100	100	2	0.03	Yes	100	100	2	0.03	Yes	No	-----	No
VOC	T	Chloroethane	75-00-3	7436	77	1.04	83		UG/L	-----	-----	-----	-----	Yes	1	29.4	29.4	6	0.08	Yes	29.4	29.4	6	0.08	Yes	No	-----	No
VOC	T	Chloromethane	74-87-3	7424	51	0.69	18000	E	UG/L	-----	-----	-----	-----	Yes	1	5.6	5.6	32	0.43	Yes	6.55	6.55	29	0.39	Yes	Yes	-----	Yes
VOC	T	cis-1,3-Dichloropropene	10061-01-5	7248	14	0.19	1600		UG/L	-----	-----	-----	-----	Yes	1	0.34	1	9	0.12	Yes	0.473	1	9	0.12	Yes	No	-----	No
VOC	T	Dibromochloromethane	124-48-1	7469	11	0.15	113		UG/L	-----	-----	-----	-----	Yes	1	54	54	1	0.01	Yes	80	80	1	0.01	Yes	No	-----	No
VOC	T	Hexachlorobutadiene	87-68-3	5884	56	0.95	520	J	UG/L	-----	-----	-----	-----	Yes	10	0.44	10	4	0.07	Yes	1.09	10	4	0.07	Yes	No	-----	No
VOC	T	Naphthalene	91-20-3	5836	206	3.53	980	E	UG/L	-----	-----	-----	-----	Yes	10	28	28	17	0.29	Yes	1460	1460	0	0.00	No	No	-----	No
VOC	T	Toluene	108-88-3	7478	287	3.84	1200	E	UG/L	-----	-----	-----	-----	Yes	5	1000	1000	1	0.01	Yes	1000	1000	1	0.01	Yes	No	-----	No
VOC	T	trans-1,2-Dichloroethene	156-60-5	5647	147	2.60	140	J	UG/L	-----	-----	-----	-----	Yes	5	100	100	2	0.04	Yes	100	100	2	0.04	Yes	No	-----	No
VOC	T	trans-1,3-Dichloropropene	10061-02-6	7250	10	0.14	8.1		UG/L	-----	-----	-----	-----	Yes	1	0.34	1	6	0.08	Yes	0.473	1	6	0.08	Yes	No	-----	No
DIOXIN	T	Hexachlorodibenzo-p-dioxin	34465-46-8	71	1	1.41	0.0011		UG/L	-----	-----	-----	-----	Yes	-----	5.60E-06	5.60E-06	1	1.41	Yes	-----	-----	-----	-----	-----	No	-----	No
MET	D	Arsenic	7440-38-2	4684	814	17.38	88		UG/L	-----	-----	-----	-----	Yes	5	0.018	5	199	4.25	Yes	50	50	6	0.13	Yes	Yes		Yes
MET	T	Barium	7440-39-3	2071	1978	95.51	11300		UG/L	208	787	38.00	Yes	Yes	100	1000	1000	79	3.81	Yes	2000	2000	29	1.40	Yes	No	-----	No
MET	T	Beryllium	7440-41-7	2044	486	23.78	263		UG/L	-----	-----	-----	-----	Yes	5	4	5	102	4.99	Yes	4	5	102	4.99	Yes	No	-----	No
MET	T	Cadmium	7440-43-9	2079	366	17.60	5000		UG/L	-----	-----	-----	-----	Yes	5	5	5	60	2.89	Yes	5	5	60	2.89	Yes	No	-----	No
MET	D	Copper	7440-50-8	4682	1364	29.13	1210		UG/L	15	130	2.78	Yes	Yes	3	12.1	12.1	193	4.12	Yes	1300	1300	0	0.00	No	No	-----	No
MET	T	Copper	7440-50-8	2102	1095	52.09	7140		UG/L	39	270	12.84	Yes	Yes	3	200	200	65	3.09	Yes	1300	1300	9	0.43	Yes	No	-----	No
MET	T	Mercury	7439-97-6	2082	236	11.34	24.2		UG/L	0.22	184	8.84	Yes	Yes	1	0.01	1	37	1.78	Yes	2	2	10	0.48	Yes	No	-----	No
MET	D	Nickel	7440-02-0	4905	1638	33.39	5390		UG/L	24	405	8.26	Yes	Yes	20	70.4	70.4	197	4.02	Yes	140	140	110	2.24	Yes	Yes		Yes
MET	D	Zinc	7440-66-6	4679	1805	38.58	9850		UG/L	56	145	3.10	Yes	Yes	20	158.7	158.7	48	1.03	Yes	11000	11000	0	0.00	No	No	-----	No
PCB	T	PCB-1254	11097-69-1	492	7	1.42	4400		UG/L	-----	-----	-----	-----	Yes	1	6.40E-05	1	5	1.02	Yes	0.5	1	5	1.02	Yes	No	-----	No
RAD	T	Americium-241	86954-36-1	3899	2511	64.40	59.91		PCI/L	0.03	372	9.54	Yes	Yes	0.03	0.15	0.15	119	3.05	Yes	0.15	0.15	119	3.05	Yes	Yes	Eliminated	No
SVOC	T	Hexachloroethane	67-72-1	633	15	2.37	179	D	UG/L	-----	-----	-----	-----	Yes	10	0.4	10	9	1.42	Yes	6.08	10	9	1.42	Yes	No	-----	No
VOC	T	1,2-Dichloroethene	540-59-0	1853	247	13.33	420	E	UG/L	-----	-----	-----	-----	Yes	5	70	70	35	1.89	Yes	70	70	35	1.89	Yes	No	-----	No
VOC	T	cis-1,2-Dichloroethene	156-59-2	5604	1595	28.46	9730	D	UG/L	-----	-----	-----	-----	Yes	5	70	70	215	3.84	Yes	70	70	215	3.84	Yes	Yes	-----	Yes
VOC	T	Total Trihalomethanes	-----	7094	7094	100.00	64000		UG/L	-----	-----	-----	-----	Yes	-----	80	80	179	2.52	Yes	80	80	179	2.52	Yes	Yes	Eliminated	No
VOC	T	Vinyl Chloride	75-01-4	7457	228	3.06	4190	D	UG/L	-----	-----	-----	-----	Yes	2	0.023	2	147	1.97	Yes	2	2	147	1.97	Yes	Yes	-----	Yes
WQP	T	Nitrite (as N)	ConID 187	65	12	18.46	10200		UG/L	149	3	4.62	Yes	Yes	500	500	500	2	3.08	Yes	1000	1000	1	1.54	Yes	No	-----	No
MET	D	Aluminum	7429-90-5	4575	1362	29.77	182000	*	UG/L	263	131	2.86	Yes	Yes	17	87	87	287	6.27	Yes	36500	36500	1	0.02	Yes	No	-----	No
MET	D	Antimony	7440-36-0	4662	526	11.28	419		UG/L	43	73	1.57	Yes	Yes	10	6	10	260	5.58	Yes	6	10	260	5.58	Yes	No	-----	No
MET	T	Antimony	7440-36-0	1968	247	12.55	2060	E	UG/L	49	47	2.39	Yes	Yes	10	6	10	187	9.50	Yes	6	10	187	9.50	Yes	No	-----	No
MET	T	Chromium	7440-47-3	2063	1200	58.17	10200		UG/L	23	539	26.13	Yes	Yes	2	50	50	289	14.01	Yes	100	100	143	6.93	Yes	Yes		Yes
MET	D	Iron	7439-89-6	4632	1731	37.37	434000	N*	UG/L	321	497	10.73	Yes	Yes	100	300	300	508	10.97	Yes	-----	-----	-----	-----	-----	No	-----	No
MET	T	Iron	7439-89-6	2104	1895	90.07	2020000		UG/L	14655	501	23.81	Yes	Yes	100	1000	1000	1343	63.83	Yes	-----	-----	-----	-----	-----	No	-----	No
MET	T	Lead	7439-92-1	2092	1379	65.92	3660		UG/L	12	436	20.84	Yes	Yes	10	50	50	128	6.12	Yes	15	15	363	17.35	Yes	No	-----	No
MET	D	Manganese	7439-96-5	4661	3096	66.42	191000	*E	UG/L	185	758	16.26	Yes	Yes	15	50	50	1241	26.63	Yes	1720	1720	183	3.93	Yes	Yes	Eliminated	No
MET	T	Manganese	7439-96-5	2104	1950	92.68	37100		UG/L	332	635	30.18	Yes	Yes	15	200	200	861	40.92	Yes	1720	1720	186	8.84	Yes	Yes	Eliminated	No
MET	T	Nickel	7440-02-0	2062	1258	61.01	6460		UG/L	33	449	21.77	Yes	Yes	20	100	100	172	8.34	Yes	140	140	126	6.11	Yes	Yes	-----	Yes
MET	D	Selenium	7782-49-2	4883	1948	39.89	3600		UG/L	50	453	9.28	Yes	Yes	10	4.6	10	875	17.92	Yes	50	50	453	9.28	Yes	Yes	Eliminated	No
MET	T	Selenium	7782-49-2	2027	699	34.48	2200		UG/L	48	157	7.75	Yes	Yes	10	20	20	218	10.75	Yes	50	50	156	7.70	Yes	Yes	Eliminated	No
RAD	T	Gross Alpha	12587-47-2	523	512	97.90	6300		PCI/L	391	15	2.87	Yes	Yes	2	7	7	399	76.29	Yes	15	15	277	52.96	Yes	No	-----	No
RAD	T	Gross Beta	12587-46-1	524	513	97.90	6241.94	C	PCI/L	221	31	5.92	Yes	Yes	4	8	8	388	74.05	Yes	20000	20000	0	0.00	No	No	-----	No
RAD	T	Plutonium-239/240	-----	4010	2521	62.87	354.6	X	PCI/L	0.06	346	8.63	Yes	Yes	0.03	0.15	0.15	244	6.08	Yes	0.151	0.151	244	6.08	Yes	Yes	Eliminated	No
RAD	T	Ra-226 + Ra-228	-----	43	43	100.00	157.4		PCI/L	6.3	38	88.37	Yes	Yes	1	5	5	41	95.35	Yes	5	5	41	95.35	Yes	Yes	Eliminated	No
RAD	T	Radium-226	13982-63-3	319	313	98.12	150		PCI/L	1.3	142	44.51	Yes	Yes	1	5	5	24	7.52	Yes	5	5	24	7.52	Yes	No	-----	No
RAD	T	Radium-228	15262-20-1	50	47	94.00	150	B	PCI/L	-----	-----	-----	-----	Yes	1	5	5	32	64.00	Yes	5	5	32	64.00	Yes	No	-----	No
RAD	T	Tritium	10028-17-8	4498	2794	62.12	22648.6073		PCI/L	13539	1	0.02	Yes	Yes	400	500	500	366	8.14	Yes	20000	20000	1	0.02	Yes	No	-----	No

Table 4.3
UHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
										99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
RAD	T	Uranium	-----	394	275	69.80	527.7524673		PCI/L	114	22	5.58	Yes	Yes	0.685	10	10	188	47.72	Yes	20.56	20.56	130	32.99	Yes	No	-----	No
RAD	T	Uranium Isotopes	-----	1059	1059	100.00	7220		PCI/L	114	44	4.15	Yes	Yes	0.685	10	10	399	37.68	Yes	20.56	20.56	237	22.38	Yes	Yes	-----	Yes
RAD	T	Uranium-233,-234	-----	1059	1002	94.62	3400	B	PCI/L	145	12	1.13	Yes	Yes	1	10	10	270	25.50	Yes	1.06	1.06	861	81.30	Yes	No	-----	No
RAD	T	Uranium-238	7440-61-1	1059	998	94.24	3700	B	PCI/L	114	8	0.76	Yes	Yes	1	10	10	201	18.98	Yes	0.768	1	786	74.22	Yes	No	-----	No
SVOC	T	bis(2-ethylhexyl)phthalate	117-81-7	621	166	26.73	230		UG/L	-----	-----	-----	-----	Yes	10	1.2	10	38	6.12	Yes	6	10	38	6.12	Yes	No	-----	No
VOC	T	1,1-Dichloroethene	75-35-4	7470	1254	16.79	18000		UG/L	-----	-----	-----	-----	Yes	1	7	7	487	6.52	Yes	7	7	487	6.52	Yes	Yes	-----	Yes
VOC	T	Carbon Tetrachloride	56-23-5	7445	1840	24.71	100000	D	UG/L	-----	-----	-----	-----	Yes	1	0.23	1	1468	19.72	Yes	5	5	1205	16.19	Yes	Yes	-----	Yes
VOC	T	Chloroform	67-66-3	7442	2168	29.13	64000	E	UG/L	-----	-----	-----	-----	Yes	1	3.4	3.4	1127	15.14	Yes	80	80	285	3.83	Yes	Yes	-----	Yes
VOC	T	Methylene Chloride	75-09-2	7422	1240	16.71	43000	D	UG/L	-----	-----	-----	-----	Yes	1	4.6	4.6	373	5.03	Yes	5	5	353	4.76	Yes	Yes	-----	Yes
VOC	T	Tetrachloroethene	127-18-4	7465	2916	39.06	100000	BE	UG/L	-----	-----	-----	-----	Yes	1	0.69	1	2201	29.48	Yes	5	5	1544	20.68	Yes	Yes	-----	Yes
VOC	T	Trichloroethene	79-01-6	7471	2952	39.51	220000	E	UG/L	-----	-----	-----	-----	Yes	1	2.5	2.5	1972	26.40	Yes	5	5	1702	22.78	Yes	Yes	-----	Yes
WQP	T	Ammonia (as N)	7664-41-7	1170	395	33.76	722000		UG/L	-----	-----	-----	-----	Yes	100	500	500	120	10.26	Yes	35400	35400	5	0.43	Yes	No	-----	No
WQP	T	Chloride	16887-00-6	3944	3856	97.77	3010000		UG/L	42370	1954	49.54	Yes	Yes	500	250000	250000	207	5.25	Yes	-----	-----	0	0.00	-----	No	-----	No
WQP	T	Cyanide	57-12-5	2681	329	12.27	2950	B	UG/L	-----	-----	-----	-----	Yes	5	5	5	162	6.04	Yes	200	200	3	0.11	Yes	No	-----	No
WQP	T	Fluoride	16984-48-8	3887	3748	96.42	12550		UG/L	1711	401	10.32	Yes	Yes	500	2000	2000	303	7.80	Yes	4000	4000	66	1.70	Yes	Yes	-----	Yes
WQP	T	Nitrate (as N)	ConID 184	241	211	87.55	688900		UG/L	5261	47	19.50	Yes	Yes	500	10000	10000	19	7.88	Yes	10000	10000	19	7.88	Yes	No	-----	No
WQP	T	Nitrate/Nitrite (as N)	ConID 184	5894	5360	90.94	17600000		UG/L	5261	1682	28.54	Yes	Yes	50	10000	10000	877	14.88	Yes	10000	10000	877	14.88	Yes	Yes	-----	Yes
WQP	T	Sulfate	14808-79-8	4557	4519	99.17	6500000		UG/L	493221	314	6.89	Yes	Yes	5000	250000	250000	663	14.55	Yes	500000	500000	308	6.76	Yes	No	-----	No
WQP	T	Sulfide	18496-25-8	230	140	60.87	73000		UG/L	-----	-----	-----	-----	Yes	2	2	2	140	60.87	Yes	-----	-----	-----	-----	-----	No	-----	No

----- Not applicable

For analytes without a surface water standard or whose surface water standard is greater than the MCL, the frequency of detection of the analyte concentration above the MCL is greater than 0 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than 0 percent and less than 1 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than or equal to 1 percent and less than 5 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than 5 percent.

Note: The information presented in this table is listed in order of increasing frequency of detection above the lowest surface water standard or PQL (whichever is higher).

Table 4.4
LHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL				AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
									99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standardor PQL?	MCL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
DIOXIN	T	2378-TCDD	13	0	0.00	0.01	U	UG/L	-----	0	0.00	-----	Yes	0.00001	0.000000005	0.00001	0	0.00	No	0.00003	0	0.00	No	No	-----	No
DIOXIN	T	Tetrachlorodibenzo-p-dioxin	13	0	0.00	0.01	U	UG/L	-----	0	0.00	-----	Yes	0.00001	0.000000005	0.00001	0	0.00	No	0.00003	0	0.00	No	No	-----	No
FUNG	T	Pentachlorobenzene	6	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	1.4	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
HERB	T	2,4,5-TP (Silvex)	11	0	0.00	1.8	U	UG/L	-----	0	0.00	-----	Yes	5	10	10	0	0.00	No	50	0	0.00	No	No	-----	No
HERB	T	2,4-D	11	0	0.00	12	U	UG/L	-----	0	0.00	-----	Yes	1	70	70	0	0.00	No	70	0	0.00	No	No	-----	No
HERB	T	Acrolein	6	0	0.00	500	U	UG/L	-----	0	0.00	-----	Yes	10	3.5	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
HERB	T	Dinoseb	6	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	2	7	7	0	0.00	No	7	0	0.00	No	No	-----	No
METAL	T	Arsenic	208	115	55.29	36.4	N	UG/L	9.51	12	5.77	Yes	Yes	5	50	50	0	0.00	No	50	0	0.00	No	No	-----	No
METAL	T	Cobalt	210	63	30.00	1620		UG/L	-----	0	0.00	-----	Yes	50	-----	-----	0	0.00	-----	2190	0	0.00	No	No	-----	No
METAL	T	Lithium	211	178	84.36	213		UG/L	137.26	16	7.58	Yes	Yes	100	-----	-----	0	0.00	-----	730	0	0.00	No	No	-----	No
METAL	T	Mercury	211	8	3.79	0.74		UG/L	0.28	3	1.42	Yes	Yes	1	0.01	1	0	0.00	No	2	0	0.00	No	No	-----	No
METAL	D	Mercury	426	9	2.11	1.2		UG/L	-----	0	0.00	-----	Yes	1	1.4	1.4	0	0.00	No	2	0	0.00	No	No	-----	No
METAL	T	Molybdenum	211	74	35.07	1600		UG/L	129.48	4	1.90	Yes	Yes	30	-----	-----	0	0.00	-----	183	4	1.90	Yes	No	-----	No
METAL	T	Selenium	207	47	22.71	13.4	S	UG/L	3.27	12	5.80	Yes	Yes	10	20	20	0	0.00	No	50	0	0.00	No	No	-----	No
METAL	T	Strontium	210	210	100.00	3340		UG/L	1430.5	23	10.95	Yes	Yes	200	-----	-----	0	0.00	-----	21900	0	0.00	No	No	-----	No
METAL	T	Thallium	211	13	6.16	6	BW	UG/L	6.36	0	0.00	No	Yes	12	0.5	12	0	0.00	No	12	0	0.00	No	No	-----	No
METAL	T	Tin	210	24	11.43	94.7	B	UG/L	130.28	0	0.00	No	Yes	200	-----	-----	0	0.00	-----	21900	0	0.00	No	No	-----	No
METAL	T	Vanadium	211	132	62.56	1670		UG/L	47.75	12	5.69	Yes	Yes	40	-----	-----	0	0.00	-----	256	1	0.47	Yes	No	-----	No
METAL	T	Zinc	211	165	78.20	1800		UG/L	222.56	6	2.84	Yes	Yes	20	2000	2000	0	0.00	No	11000	0	0.00	No	No	-----	No
METAL	D	Zinc	426	122	28.64	80.9		UG/L	41.99	4	0.94	Yes	Yes	20	158.7	158.7	0	0.00	No	11000	0	0.00	No	No	-----	No
ORG	T	Aniline	6	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	6.1	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
ORG	T	Aramite I	3	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	20	1.4	20	0	0.00	No	-----	0	0.00	-----	No	-----	No
ORG	T	Atamite II	4	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	20	1.4	20	0	0.00	No	-----	0	0.00	-----	No	-----	No
ORG	T	bis(2-Chloroethyl) Ether	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.03	10	0	0.00	No	10	0	0.00	No	No	-----	No
ORG	T	bis(2-Chloroisopropyl) Ether	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	280	280	0	0.00	No	10	0	0.00	No	No	-----	No
PCB	T	PCB-1016	22	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1221	22	0	0.00	2	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1232	22	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1242	24	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1248	24	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1254	22	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PCB	T	PCB-1260	24	0	0.00	1	U	UG/L	-----	0	0.00	-----	Yes	1	0.000064	1	0	0.00	No	1	0	0.00	No	No	-----	No
PEST	T	4,4'-DDD	24	0	0.00	0.11	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.00031	0.1	0	0.00	No	0.355	0	0.00	No	No	-----	No
PEST	T	4,4'-DDE	24	0	0.00	0.1	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.00022	0.1	0	0.00	No	0.25	0	0.00	No	No	-----	No
PEST	T	4,4'-DDT	24	0	0.00	0.12	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.00022	0.1	0	0.00	No	0.25	0	0.00	No	No	-----	No
PEST	T	Aldrin	24	0	0.00	0.051	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.000049	0.1	0	0.00	No	0.1	0	0.00	No	No	-----	No
PEST	T	alpha-BHC	24	0	0.00	0.051	U	UG/L	-----	0	0.00	-----	Yes	0.05	0.0026	0.05	0	0.00	No	0.2	0	0.00	No	No	-----	No
PEST	T	alpha-Chlordane	18	0	0.00	0.51	U	UG/L	-----	0	0.00	-----	Yes	1	0.0008	1	0	0.00	No	2	0	0.00	No	No	-----	No
PEST	T	beta-BHC	24	0	0.00	0.06	U	UG/L	-----	0	0.00	-----	Yes	0.05	0.0091	0.05	0	0.00	No	0.2	0	0.00	No	No	-----	No
PEST	T	beta-Chlordane	17	0	0.00	0.51	U	UG/L	-----	0	0.00	-----	Yes	1	0.0008	1	0	0.00	No	2	0	0.00	No	No	-----	No
PEST	T	Chlordane (NOS)	6	0	0.00	0.14	U	UG/L	-----	0	0.00	-----	Yes	1	0.0008	1	0	0.00	No	2	0	0.00	No	No	-----	No
PEST	T	Dieldrin	24	0	0.00	0.1	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.000052	0.1	0	0.00	No	0.1	0	0.00	No	No	-----	No
PEST	T	Endosulfan I	24	0	0.00	0.14	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.056	0.1	0	0.00	No	219	0	0.00	No	No	-----	No
PEST	T	Endosulfan II	24	0	0.00	0.1	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.056	0.1	0	0.00	No	219	0	0.00	No	No	-----	No
PEST	T	Endosulfan sulfate	24	0	0.00	0.66	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.056	0.1	0	0.00	No	219	0	0.00	No	No	-----	No
PEST	T	Endrin	24	0	0.00	0.1	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.036	0.1	0	0.00	No	2	0	0.00	No	No	-----	No
PEST	T	gamma-BHC (Lindane)	24	0	0.00	0.051	U	UG/L	-----	0	0.00	-----	Yes	0.05	0.08	0.08	0	0.00	No	0.2	0	0.00	No	No	-----	No
PEST	T	gamma-Chlordane	1	0	0.00	0.48	U	UG/L	-----	0	0.00	-----	Yes	1	0.0008	1	0	0.00	No	2	0	0.00	No	No	-----	No
PEST	T	Heptachlor	24	0	0.00	0.051	U	UG/L	-----	0	0.00	-----	Yes	0.05	0.000078	0.05	0	0.00	No	0.4	0	0.00	No	No	-----	No
PEST	T	Heptachlor epoxide	24	0	0.00	0.83	U	UG/L	-----	0	0.00	-----	Yes	0.05	0.000039	0.05	0	0.00	No	0.2	0	0.00	No	No	-----	No

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Table 4.4
LHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL				AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
									99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standardor PQL?	MCL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
PEST	T	Methoxychlor	24	0	0.00	1.8	U	UG/L	-----	0	0.00	-----	Yes	0.5	0.03	0.5	0	0.00	No	40	0	0.00	No	No	-----	No
PEST	T	Parathion	12	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	0.013	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
PEST	T	Toxaphene	24	0	0.00	5	U	UG/L	-----	0	0.00	-----	Yes	3	0.0002	3	0	0.00	No	3	0	0.00	No	No	-----	No
RAD	T	Cesium-134	1	1	100.00	1.489	J	PCI/L	-----	0	0.00	-----	Yes	10	80	80	0	0.00	No	-----	0	0.00	-----	No	-----	No
RAD	T	Cesium-137	54	53	98.15	3.7	B	PCI/L	0.96	1	1.85	Yes	Yes	10	-----	-----	0	0.00	-----	10	0	0.00	No	No	-----	No
RAD	D	Uranium	3	0	0.00	46.59836	U	PCI/L	16.19	0	0.00	Yes	Yes	0.685	2442	2442	0	0.00	No	20.56	0	0.00	No	No	-----	No
RAD	D	URANIUM SUM	430	430	100.00	56.3		PCI/L	16.19	3	0.70	Yes	Yes	0.685	2442	2442	0	0.00	No	20.56	3	0.70	Yes	No	-----	No
RAD	T	Uranium-233,-234	58	57	98.28	7.35494		PCI/L	7.79	0	0.00	No	Yes	1	10	10	0	0.00	No	1.06	43	74.14	Yes	No	-----	No
RAD	T	Uranium-235	58	34	58.62	0.8291874		PCI/L	0.27	8	13.79	Yes	Yes	1	10	10	0	0.00	No	1.01	0	0.00	No	No	-----	No
RAD	T	Uranium-238	58	54	93.10	8.3	B	PCI/L	48.13	0	0.00	No	Yes	1	10	10	0	0.00	No	1	37	63.79	Yes	No	-----	No
SVOC	T	1,2,4,5-Tetrachlorobenzene	6	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	0.97	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	2,4,5-Trichlorophenol	46	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	10	700	700	0	0.00	No	50	0	0.00	No	No	-----	No
SVOC	T	2,4,6-Trichlorophenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	50	1.4	50	0	0.00	No	50	0	0.00	No	No	-----	No
SVOC	T	2,4-Dichlorophenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	50	21	50	0	0.00	No	110	0	0.00	No	No	-----	No
SVOC	T	2,4-Dimethylphenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	50	140	140	0	0.00	No	730	0	0.00	No	No	-----	No
SVOC	T	2,4-Dinitrophenol	44	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	14	50	0	0.00	No	73	0	0.00	No	No	-----	No
SVOC	T	2,4-Dinitrotoluene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.11	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	2,6-Dinitrotoluene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	230	230	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	2-Chloronaphthalene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	560	560	0	0.00	No	2920	0	0.00	No	No	-----	No
SVOC	T	2-Chlorophenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	50	35	50	0	0.00	No	183	0	0.00	No	No	-----	No
SVOC	T	2-Methylnaphthalene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	-----	-----	0	0.00	-----	1460	0	0.00	No	No	-----	No
SVOC	T	2-Methylphenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	1830	1830	0	0.00	No	1830	0	0.00	No	No	-----	No
SVOC	T	2-Nitroaniline	47	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	-----	-----	0	0.00	-----	50	0	0.00	No	No	-----	No
SVOC	T	3,3'-Dichlorobenzidine	41	0	0.00	22	U	UG/L	-----	0	0.00	-----	Yes	10	0.021	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	4,6-Dinitro-2-methylphenol	45	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	0.27	50	0	0.00	No	50	0	0.00	No	No	-----	No
SVOC	T	4-Chloro-3-methylphenol	46	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	50	30	50	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	4-Chloroaniline	44	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	20	-----	-----	0	0.00	-----	146	0	0.00	No	No	-----	No
SVOC	T	4-Methylphenol	40	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	-----	-----	0	0.00	-----	183	0	0.00	No	No	-----	No
SVOC	T	4-Nitrophenol	46	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	56	56	0	0.00	No	292	0	0.00	No	No	-----	No
SVOC	T	Acenaphthene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	420	420	0	0.00	No	2190	0	0.00	No	No	-----	No
SVOC	T	Acenaphthylene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0028	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	Anthracene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	2100	2100	0	0.00	No	11000	0	0.00	No	No	-----	No
SVOC	T	Benzo(a)anthracene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Benzo(a)pyrene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	0.2	0.0038	0.2	0	0.00	No	0.2	0	0.00	No	No	-----	No
SVOC	T	Benzo(b)fluoranthene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Benzo(g,h,i)perylene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	Benzo(k)fluoranthene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Benzoic Acid	24	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	-----	-----	0	0.00	-----	146000	0	0.00	No	No	-----	No
SVOC	T	Benzyl Alcohol	30	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	20	-----	-----	0	0.00	-----	11000	0	0.00	No	No	-----	No
SVOC	T	Butylbenzylphthalate	47	1	2.13	1	J	UG/L	-----	0	0.00	-----	Yes	10	1400	1400	0	0.00	No	7300	0	0.00	No	No	-----	No
SVOC	T	Chrysene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	11.7	0	0.00	No	No	-----	No
SVOC	T	Dibenz(a,h)anthracene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Dibenzofuran	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	-----	-----	0	0.00	-----	146	0	0.00	No	No	-----	No
SVOC	T	Diethylphthalate	47	4	8.51	9	J	UG/L	-----	0	0.00	-----	Yes	10	5600	5600	0	0.00	No	29200	0	0.00	No	No	-----	No
SVOC	T	Dimethylphthalate	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	70000	70000	0	0.00	No	365000	0	0.00	No	No	-----	No
SVOC	T	Di-n-butylphthalate	47	4	8.51	5	J	UG/L	-----	0	0.00	-----	Yes	10	700	700	0	0.00	No	3650	0	0.00	No	No	-----	No
SVOC	T	Di-n-octylphthalate	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	-----	-----	0	0.00	-----	730	0	0.00	No	No	-----	No
SVOC	T	Endrin aldehyde	18	0	0.00	0.23	U	UG/L	-----	0	0.00	-----	Yes	0.1	0.29	0.29	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	Fluoranthene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	130	130	0	0.00	No	1460	0	0.00	No	No	-----	No
SVOC	T	Fluorene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	280	280	0	0.00	No	1460	0	0.00	No	No	-----	No

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Table 4.4
LHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL				AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
									99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (Dist is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standardor PQL?	MCL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
SVOC	T	Hexachlorobenzene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.00028	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Hexachlorocyclopentadiene	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	5	10	0	0.00	No	50	0	0.00	No	No	-----	No
SVOC	T	Hexachloroethane	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.4	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Indeno(1,2,3-cd)pyrene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0038	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	Isophorone	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	36	36	0	0.00	No	89.6	0	0.00	No	No	-----	No
SVOC	T	Nitrobenzene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	3.5	10	0	0.00	No	18.3	0	0.00	No	No	-----	No
SVOC	T	N-Nitrosodiethylamine	6	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	10	0.00023	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	N-Nitrosodimethylamine	6	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	0.00069	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	N-Nitrosodi-n-butylamine	4	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	10	0.0043	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	N-Nitroso-di-n-propylamine	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.005	10	0	0.00	No	10	0	0.00	No	No	-----	No
SVOC	T	N-Nitrosomethylethylamine	6	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes		0.0016	0.0016	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	N-Nitrosopyrrolidine	6	0	0.00	40	U	UG/L	-----	0	0.00	-----	Yes	10	0.016	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	Pentachlorophenol	46	0	0.00	56	U	UG/L	-----	0	0.00	-----	Yes	50	0.27	50	0	0.00	No	50	0	0.00	No	No	-----	No
SVOC	T	Phenanthrene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	0.0028	10	0	0.00	No	-----	0	0.00	-----	No	-----	No
SVOC	T	Phenol	46	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	50	2100	2100	0	0.00	No	21900	0	0.00	No	No	-----	No
SVOC	T	Pyrene	47	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	210	210	0	0.00	No	1100	0	0.00	No	No	-----	No
VOC	T	1,1,1-Trichloroethane	604	4	0.66	9	B	UG/L	-----	0	0.00	-----	Yes	5	200	200	0	0.00	No	200	0	0.00	No	No	-----	No
VOC	T	1,1,2,2-Tetrachloroethane	604	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	0.17	1	0	0.00	No	1	0	0.00	No	No	-----	No
VOC	T	1,1,2-Trichloroethane	606	1	0.17	0.3	J	UG/L	-----	0	0.00	-----	Yes	1	2.7	2.7	0	0.00	No	5	0	0.00	No	No	-----	No
VOC	T	1,1-Dichloroethane	606	1	0.17	0.2		UG/L	-----	0	0.00	-----	Yes	1	3650	3650	0	0.00	No	3650	0	0.00	No	No	-----	No
VOC	T	1,1-Dichloroethene	604	2	0.33	2	J	UG/L	-----	0	0.00	-----	Yes	1	7	7	0	0.00	No	7	0	0.00	No	No	-----	No
VOC	T	1,2,4-Trichlorobenzene	307	2	0.65	0.534		UG/L	-----	0	0.00	-----	Yes	10	35	35	0	0.00	No	70	0	0.00	No	No	-----	No
VOC	T	1,2-Dibromoethane	286	0	0.00	20	U	UG/L	-----	0	0.00	-----	Yes	1	0.00041	1	0	0.00	No	1	0	0.00	No	No	-----	No
VOC	T	1,2-Dichlorobenzene	307	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	420	420	0	0.00	No	600	0	0.00	No	No	-----	No
VOC	T	1,2-Dichloroethane	603	2	0.33	0.877		UG/L	-----	0	0.00	-----	Yes	1	0.38	1	0	0.00	No	5	0	0.00	No	No	-----	No
VOC	T	1,2-Dichloroethene	322	2	0.62	2	J	UG/L	-----	0	0.00	-----	Yes	5	70	70	0	0.00	No	70	0	0.00	No	No	-----	No
VOC	T	1,2-Dichloropropane	606	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	0.5	1	0	0.00	No	5	0	0.00	No	No	-----	No
VOC	T	1,3-Dichlorobenzene	307	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	94	94	0	0.00	No	600	0	0.00	No	No	-----	No
VOC	T	1,4-Dichlorobenzene	307	0	0.00	11	U	UG/L	-----	0	0.00	-----	Yes	10	63	63	0	0.00	No	75	0	0.00	No	No	-----	No
VOC	T	2-Butanone	195	0	0.00	100	U	UG/L	-----	0	0.00	-----	Yes	10	21900	21900	0	0.00	No	21900	0	0.00	No	No	-----	No
VOC	T	4-Methyl-2-pentanone	326	1	0.31	4	J	UG/L	-----	0	0.00	-----	Yes	10	2920	2920	0	0.00	No	2920	0	0.00	No	No	-----	No
VOC	T	Acetone	301	16	5.32	36		UG/L	-----	0	0.00	-----	Yes	10	3650	3650	0	0.00	No	3650	0	0.00	No	No	-----	No
VOC	T	Acrylonitrile	15	0	0.00	100	U	UG/L	-----	0	0.00	-----	Yes	5	0.051	5	0	0.00	No	-----	0	0.00	-----	No	-----	No
VOC	T	Bromodichloromethane	604	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	0.55	1	0	0.00	No	80	0	0.00	No	No	-----	No
VOC	T	Bromoform	596	1	0.17	0.9	J	UG/L	-----	0	0.00	-----	Yes	1	4.3	4.3	0	0.00	No	80	0	0.00	No	No	-----	No
VOC	T	Bromomethane	592	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	9.8	9.8	0	0.00	No	51.1	0	0.00	No	No	-----	No
VOC	T	Carbon Disulfide	334	6	1.80	5		UG/L	-----	0	0.00	-----	Yes	1	3650	3650	0	0.00	No	3650	0	0.00	No	No	-----	No
VOC	T	Chlorobenzene	606	1	0.17	0.5	J	UG/L	-----	0	0.00	-----	Yes	5	100	100	0	0.00	No	100	0	0.00	No	No	-----	No
VOC	T	Chloroethane	604	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	29.4	29.4	0	0.00	No	29.4	0	0.00	No	No	-----	No
VOC	T	Chloromethane	598	1	0.17	0.29	J	UG/L	-----	0	0.00	-----	Yes	1	5.6	5.6	0	0.00	No	6.55	0	0.00	No	No	-----	No
VOC	T	cis-1,2-Dichloroethene	281	2	0.71	1.2		UG/L	-----	0	0.00	-----	Yes	5	70	70	0	0.00	No	70	0	0.00	No	No	-----	No
VOC	T	cis-1,3-Dichloropropene	592	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	0.34	1	0	0.00	No	1	0	0.00	No	No	-----	No
VOC	T	Dibromochloromethane	606	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	54	54	0	0.00	No	80	0	0.00	No	No	-----	No
VOC	T	Ethylbenzene	605	1	0.17	1	J	UG/L	-----	0	0.00	-----	Yes	10	530	530	0	0.00	No	700	0	0.00	No	No	-----	No
VOC	T	Hexachlorobutadiene	307	2	0.65	0.582		UG/L	-----	0	0.00	-----	Yes	10	0.44	10	0	0.00	No	10	0	0.00	No	No	-----	No
VOC	T	m,p-Xylene	164	0	0.00	0.5	U	UG/L	-----	0	0.00	-----	Yes	5	1400	1400	0	0.00	No	10000	0	0.00	No	No	-----	No
VOC	T	m-Xylene	1	0	0.00	0.2	U	UG/L	-----	0	0.00	-----	Yes	5	1400	1400	0	0.00	No	10000	0	0.00	No	No	-----	No
VOC	T	Naphthalene	304	2	0.66	2	J	UG/L	-----	0	0.00	-----	Yes	10	28	28	0	0.00	No	1460	0	0.00	No	No	-----	No
VOC	T	o-Xylene	165	0	0.00	0.5	U	UG/L	-----	0	0.00	-----	Yes	5	1400	1400	0	0.00	No	10000	0	0.00	No	No	-----	No
VOC	T	p-Xylene	1	0	0.00	0.2	U	UG/L	-----	0	0.00	-----	Yes	5	1400	1400	0	0.00	No	10000	0	0.00	No	No	-----	No

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Table 4.4
LHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL				AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
									99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standardor PQL?	MCL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
VOC	T	Styrene	605	3	0.50	2	J	UG/L	-----	0	0.00	-----	Yes	5	100	100	0	0.00	No	100	0	0.00	No	No	-----	No
VOC	T	Toluene	606	18	2.97	24		UG/L	-----	0	0.00	-----	Yes	5	1000	1000	0	0.00	No	1000	0	0.00	No	No	-----	No
VOC	T	trans-1,2-Dichloroethene	290	0	0.00	5	U	UG/L	-----	0	0.00	-----	Yes	5	100	100	0	0.00	No	100	0	0.00	No	No	-----	No
VOC	T	trans-1,3-Dichloropropene	592	0	0.00	10	U	UG/L	-----	0	0.00	-----	Yes	1	0.34	1	0	0.00	No	1	0	0.00	No	No	-----	No
VOC	T	Total Trihalomethanes	587	587	100.00	18		UG/L	-----	0	0.00	-----	Yes		80	80	0	0.00	No	80	0	0.00	No	No	-----	No
VOC	T	Vinyl Acetate	286	0	0.00	50	U	UG/L	-----	0	0.00	-----	Yes	5	-----	-----	0	0.00	-----	36500	0	0.00	No	No	-----	No
VOC	T	Total Xylenes	440	9	2.05	23		UG/L	-----	0	0.00	-----	Yes	5	1400	1400	0	0.00	No	10000	0	0.00	No	No	-----	No
WQP	T	Fluoride	550	538	97.82	1900		UG/L	2033.58	0	0.00	No	Yes	500	2000	2000	0	0.00	No	4000	0	0.00	No	No	-----	No
WQP	T	Nitrate (as N)	13	10	76.92	2060		UG/L	3737.87	0	0.00	No	Yes	500	10000	10000	0	0.00	No	10000	0	0.00	No	No	-----	No
WQP	T	Nitrite (as N)	7	4	57.14	299		UG/L	1407.78	0	0.00	No	Yes	500	500	500	0	0.00	No	1000	0	0.00	No	No	-----	No
VOC	T	Vinyl Chloride	605	1	0.17	28		UG/L	-----	0	0.00	-----	Yes	2	0.023	2	1	0.17	Yes	2	1	0.17	Yes	No	-----	No
VOC	T	Benzene	604	9	1.49	5		UG/L	-----	0	0.00	-----	Yes	1	2.2	2.2	1	0.17	Yes	5	0	0.00	No	No	-----	No
WQP	T	Nitrate/Nitrite (as N)	522	432	82.76	230000		UG/L	3737.87	32	6.13	Yes	Yes	50	10000	10000	1	0.19	Yes	10000	1	0.19	Yes	No	-----	No
METAL	D	Chromium	437	31	7.09	157		UG/L	13.55	9	2.06	Yes	Yes	2	99.3	99.3	1	0.23	Yes	100	1	0.23	Yes	No	-----	No
METAL	D	Thallium	428	13	3.04	13.2		UG/L	7.62	4	0.93	Yes	Yes	12	0.5	12	1	0.23	Yes	12	1	0.23	Yes	No	-----	No
RAD	T	Americium-241	308	214	69.48	0.47		PCI/L	0.07	7	2.27	Yes	Yes	0.03	0.15	0.15	1	0.32	Yes	0.15	1	0.32	Yes	No	-----	No
METAL	D	Silver	427	17	3.98	8.6	B	UG/L	9.03	0	0.00	No	Yes	5	0.59	5	2	0.47	Yes	183	0	0.00	No	No	-----	No
METAL	D	Lead	426	20	4.69	123		UG/L	17.83	1	0.23	Yes	Yes	10	3.7	10	2	0.47	Yes	15	1	0.23	Yes	No	-----	No
METAL	T	Silver	209	14	6.70	300		UG/L	-----	0	0.00	-----	Yes	5	100	100	1	0.48	Yes	183	1	0.48	Yes	No	-----	No
VOC	T	Chloroform	601	16	2.66	18		UG/L	-----	0	0.00	-----	Yes	1	3.4	3.4	4	0.67	Yes	80	0	0.00	No	No	-----	No
METAL	D	Cadmium	428	27	6.31	8.9		UG/L	5.8	3	0.70	Yes	Yes	5	1.5	5	3	0.70	Yes	5	3	0.70	Yes	No	-----	No
METAL	D	Nickel	438	59	13.47	240		UG/L	24.86	10	2.28	Yes	Yes	20	70.4	70.4	4	0.91	Yes	140	2	0.46	Yes	No	-----	No
METAL	T	Barium	211	194	91.94	1810		UG/L	286.27	30	14.22	Yes	Yes	100	1000	1000	2	0.95	Yes	2000	0	0.00	No	No	-----	No
RAD	T	Tritium	504	292	57.94	2973		PCI/L	1577.1	1	0.20	Yes	Yes	400	500	500	5	0.99	Yes	20000	0	0.00	No	No	-----	No
VOC	T	Methylene Chloride	601	65	10.82	23		UG/L	-----	0	0.00	-----	Yes	1	4.6	4.6	6	1.00	Yes	5	6	1.00	Yes	No	-----	No
VOC	T	Carbon Tetrachloride	603	13	2.16	91		UG/L	-----	0	0.00	-----	Yes	1	0.23	1	7	1.16	Yes	5	6	1.00	Yes	No	-----	No
METAL	T	Copper	211	117	55.45	1750		UG/L	84.34	7	3.32	Yes	Yes	3	200	200	3	1.42	Yes	1300	1	0.47	Yes	No	-----	No
METAL	T	Lead	211	162	76.78	115		UG/L	18.06	20	9.48	Yes	Yes	10	50	50	3	1.42	Yes	15	23	10.90	Yes	No	-----	No
METAL	T	Beryllium	210	46	21.90	160		UG/L	-----	0	0.00	-----	Yes	5	4	5	3	1.43	Yes	5	3	1.43	Yes	No	-----	No
METAL	D	Copper	423	59	13.95	34.6		UG/L	15.82	3	0.71	Yes	Yes	3	12.1	12.1	8	1.89	Yes	1300	0	0.00	No	No	-----	No
VOC	T	Tetrachloroethene	605	39	6.45	17		UG/L	-----	0	0.00	-----	Yes	1	0.69	1	12	1.98	Yes	5	4	0.66	Yes	No	-----	No
SVOC	T	bis(2-ethylhexyl)phthalate	47	8	17.02	24		UG/L	-----	0	0.00	-----	Yes	10	1.2	10	1	2.13	Yes	10	1	2.13	Yes	No	-----	No
RAD	T	Plutonium-239/240	313	216	69.01	10.32		PCI/L	0.02	28	8.95	Yes	Yes	0.03	0.15	0.15	7	2.24	Yes	0.151	7	2.24	Yes	No	-----	No
METAL	T	Cadmium	210	29	13.81	1720		UG/L	-----	0	0.00	-----	Yes	5	5	5	5	2.38	Yes	5	5	2.38	Yes	No	-----	No
RAD	T	Strontium-89/90	42	21	50.00	32	B	PCI/L	3.34	2	4.76	Yes	Yes	1	8	8	1	2.38	Yes	1	2	4.76	Yes	No	-----	No
WQP	T	Cyanide	327	25	7.65	51		UG/L	-----	0	0.00	-----	Yes	5	5	5	8	2.45	Yes	200	0	0.00	No	No	-----	No
METAL	D	Selenium	437	92	21.05	36.1		UG/L	4.78	29	6.64	Yes	Yes	10	4.6	10	12	2.75	Yes	50	0	0.00	No	No	-----	No
VOC	T	Trichloroethene	605	59	9.75	78	E	UG/L	-----	0	0.00	-----	Yes	1	2.5	2.5	20	3.31	Yes	5	15	2.48	Yes	No	-----	No
METAL	T	Nickel	211	110	52.13	1660		UG/L	32.89	49	23.22	Yes	Yes	20	100	100	8	3.79	Yes	140	4	1.90	Yes	No	-----	No
METAL	D	Aluminum	417	88	21.10	4510		UG/L	182.67	8	1.92	Yes	Yes	17	87	87	17	4.08	Yes	36500	0	0.00	No	No	-----	No
METAL	D	Iron	421	107	25.42	38200		UG/L	141.06	32	7.60	Yes	Yes	100	300	300	19	4.51	Yes	-----	0	0.00	-----	No	-----	No
RAD	T	Radium-226	36	36	100.00	7.8	B	PCI/L	11.3	0	0.00	No	Yes	1	5	5	2	5.56	Yes	5	2	5.56	Yes	No	-----	No
METAL	D	Antimony	425	41	9.65	97		UG/L	43.37	9	2.12	Yes	Yes	10	6	10	26	6.12	Yes	10	26	6.12	Yes	No	-----	No
METAL	T	Antimony	202	19	9.41	1610		UG/L	50.28	6	2.97	Yes	Yes	10	6	10	14	6.93	Yes	10	14	6.93	Yes	No	-----	No
DIOXIN	T	Hexachlorodibenzo-p-dioxin	13	1	7.69	0.0014		UG/L	-----	0	0.00	-----	Yes		0.0000056	0.0000056	1	7.69	Yes	-----	0	0.00	-----	No	-----	No
RAD	T	Uranium Isotopes'	58	58	100.00	15.82		PCI/L	16.19	0	0.00	No	Yes	0.685	10	10	5	8.62	Yes	20.56	0	0.00	No	No	-----	No
WQP	T	Ammonia (as N)	160	102	63.75	284000		UG/L	-----	0	0.00	-----	Yes	100	500	500	14	8.75	Yes	35400	1	0.63	Yes	Yes	Eliminated	No
WQP	T	Chloride	545	524	96.15	1100000		UG/L	489654.73	37	6.79	Yes	Yes	500	250000	250000	59	10.83	Yes	-----	0	0.00	-----	No	-----	No
METAL	D	Arsenic	426	112	26.29	39.8		UG/L	7.77	36	8.45	Yes	Yes	5	0.018	5	49	11.50	Yes	50	0	0.00	No	No	-----	No
METAL	T	Chromium	211	131	62.09	1590		UG/L	20.54	75	35.55	Yes	Yes	2	50	50	38	18.01	Yes	100	16	7.58	Yes	Yes	Eliminated	No

Table 4.4
LHSU Groundwater AOI Screening

Analyte Group	Total or Dissolved	Analyte	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL				AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
									99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standardor PQL?	MCL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Is Constituent Eliminated or Retained By Process Knowledge?	
WQP	T	Sulfate	567	549	96.83	19000000		UG/L	886845.95	29	5.11	Yes	Yes	5000	250000	250000	117	20.63	Yes	500000	93	16.40	Yes	No	-----	No
METAL	D	Manganese	423	349	82.51	759		UG/L	31.31	132	31.21	Yes	Yes	15	50	50	93	21.99	Yes	1720	0	0.00	No	No	-----	No
METAL	T	Manganese	211	203	96.21	1830		UG/L	474.75	12	5.69	Yes	Yes	15	200	200	56	26.54	Yes	1720	1	0.47	Yes	No	-----	No
RAD	T	Radium-228	6	4	66.67	96	B	PCI/L	-----	0	0.00	-----	Yes	1	5	5	3	50.00	Yes	5	3	50.00	Yes	No	-----	No
WQP	T	Sulfide (as S)	25	15	60.00	72300		UG/L	-----	0	0.00	-----	Yes	2	2	2	15	60.00	Yes	-----	0	0.00	-----	No	-----	No
RAD	T	Gross Alpha	49	48	97.96	380		PCI/L	133.08	3	6.12	Yes	Yes	2	7	7	35	71.43	Yes	15	26	53.06	Yes	No	-----	No
RAD	T	Gross Beta	49	49	100.00	180		PCI/L	110.67	1	2.04	Yes	Yes	4	8	8	35	71.43	Yes	20000	0	0.00	No	No	-----	No
METAL	T	Iron	211	198	93.84	85000		UG/L	14432.11	22	10.43	Yes	Yes	100	1000	1000	151	71.56	Yes	-----	0	0.00	-----	No	-----	No
RAD	T	Ra-226 + Ra-228	6	6	100.00	103.8		PCI/L	-----	0	0.00	-----	Yes	1	5	5	5	83.33	Yes	5	5	83.33	Yes	No	-----	No

----- Not applicable

For analytes without a surface water standard or whose surface water standard is greater than the MCL, the frequency of detection of the analyte concentration above the MCL is greater than 0 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than 0 percent and less than 1 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than or equal to 1 percent and less than 5 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than 5 percent.

Table 4.5
Groundwater AOIs Eliminated By Process Knowledge

Analyte	Basis for Eliminating Constituent as a Groundwater AOI
UHSU	
Total Trihalomethanes	Total trihalomethanes (TTHM) is a calculated parameter based on the sum of the concentrations of chloroform, bromoform, bromodichloromethane, and dibromochloromethane. Comparison of the percentage of constituents making up TTHM at RFETS indicates that chloroform comprises about 99% of the TTHM in 166 of 174 wells where TTHM exceeded the surface water standard. In comparison to chloroform, the concentrations of brominated TTHM components are generally very low and detections above the surface water standard are not widespread in groundwater at RFETS. On this basis, TTHM are eliminated as a groundwater AOI and chloroform is evaluated as an AOI.
Manganese	Manganese was not identified or discussed in building process information and has not been found to be associated with UBC Sites (K-H 2005). Only small quantities were identified to be in inventory with the exception of manganous sulfate which had an inventory in 1974 of 2,560 kilograms and then later in 1988 of 0.06 kilogram (the specific use was not clear). Based on the limited use of manganese, its release to the environment was estimated to be minimal or there would be no release.
Selenium	Selenium was not identified or discussed in building process information and has not been found to be associated with UBC Sites (K-H 2005). Selenium compounds appear to have been used as laboratory standards or analytical testing materials since they were used in very small quantities. Based on the limited use of selenium, its release to the environment was estimated to be minimal or there would be no release.
Americium-241	Americium-241 is not present as a dissolved constituent in groundwater at the site. Americium-241 has historically been detected as a groundwater contaminant at RFETS as a result of contaminated surface soil introduced down boreholes during well construction, causing misleading sample results with respect to groundwater quality. To evaluate this condition, specially constructed "aseptic" wells were installed to minimize the amount of surface material introduced down the boreholes. The aseptic wells demonstrated low (femtoCurie/liter) concentrations of americium in the groundwater, despite being paired with traditional wells with historic elevated concentrations of Americium-241. Further discussion is presented in Appendix C of the Groundwater IM/IRA (DOE 2005).
Plutonium-239/240	Similar to Americium-241, plutonium-239/240 was also eliminated as an AOI based on knowledge that Plutonium-239/240 is not present as a dissolved constituent in groundwater at the site. Plutonium-239/240 has historically been detected as a groundwater contaminant at RFETS as a result of contaminated surface soil introduced down boreholes, causing misleading results with respect to groundwater quality. Aseptic wells indicated negligible (femtoCurie) concentrations of Plutonium-239/240. Further discussion is presented in Appendix C of the Groundwater IM/IRA (DOE 2005).
Radium-226 + Radium-228	Review of the groundwater radium data and Draft Groundwater Nature and Extent screening process indicates that dissolved Ra-226 + Ra-228 and dissolved or total Ra-226 or Ra-228 were not retained as an analytes of interest (AOIs) because there is not a surface water standard for these analytes. The surface water standard for radium is total radium-226 (Ra-226) + radium-228 (Ra-228) and is 5 pCi/L. At RFETS, Ra-228 is the predominant radium isotope comprising the total radium activity. In screening total Ra-226 + Ra-228 data, the 99/99 upper tolerance limit (99/99 UTL) for dissolved Ra-226 + Ra-228 (6.3 pCi/L) was used for the UTL screen because there are no background data for total Ra-228 in groundwater to allow development of a total radium 99/99 UTL. In using the 99/99 UTL for dissolved radium to compare total Ra-226 + Ra-228, we recognize that this screen is conservative, since radium is a moderately sorbed constituent on the particulate fraction. The dissolved radium 99/99 UTL likely

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Table 4.5
Groundwater AOIs Eliminated By Process Knowledge

Analyte	Basis for Eliminating Constituent as a Groundwater AOI
	underestimates the total Ra-226 + Ra-228 background activity in groundwater since total radium represents both the dissolved and sorbed fraction transported by groundwater and its UTL should be higher than the dissolved radium UTL. Review of the available total Ra-226 + Ra-228 data (26 locations) shown on Figure 1 indicates that the groundwater results range between 3.9 and 157.4 pCi/L with a median value of 9.2 pCi/L. All but four of the total radium results are above the dissolved radium UTL (as expected) and the surface water standard. However, it is believed that most of these results are representative of background total radium and only five results appear to represent potential contamination. Most of the results (21 locations) are less than 20 pCi/L, four results are between 20 and 30 pCi/L, and one result is 157 pCi/L. The highest total radium result occurs at well 56993 in the Ash Pit area (IHSS 133.2). The other locations with total radium results above 20 pCi/L occur at the Original Landfill (well 58693), the West Spray Field (well 50894), and adjacent to Buildings 331 (well P115489) and 551 (P115589). All of these locations have adjacent wells whose total radium activity appears to be representative of background, thus limiting the potential for a contiguous, mappable total radium groundwater plume of significant areal extent to exist and potentially impact surface water. A review of the historical radium use at RFETS is presented in the July 15, 2005 "Review of Historical Knowledge Related to Metals and Selected Radionuclides Identified as Environmental Media Analytes of Interest White Paper" (DOE 2005). Information presented in this white paper from the ChemRisk Task 1 Report (CDH 1991) concerning radium indicates that Ra-226, a daughter of uranium-238 decay, was used in small quantities for research, analysis, and calibration (e.g., sealed and plated sources) at the Site. In addition, the only Ra-226 waste generated at RFETS, based on WEMS and WSRIC, was as sealed sources. Because of the limited quantity of Ra-226 used and its waste form, it was not carried forward through the ChemRisk process (CDH 1991). However, Ra-226 is a daughter product of U-238 decay and could be potentially derived from both natural uranium present in the region and uranium metal fabrication and processing conducted at the site. Ra-228 was not identified in the ChemRisk Task 1 Report as a radionuclide used at the Rocky Flats Plant (CDH 1991). Furthermore, no Ra-228 waste was reported to have been generated based on WEMS and WSRIC. However, thorium-232, the parent radionuclide for Ra-228, was used at RFETS to fabricate metal parts from thorium and thorium alloys in Building 881. Thorium and its compounds were also used in analytical procedures and other research and development programs in Building 771. It was concluded during the development of the ChemRisk reports that Th-232 was most likely released as airborne particulates and was not a significant component of airborne effluent (CDH 1991). Furthermore, Th-232 was not used in significant quantities relative to other production radionuclides, thus, a source term was not developed for Th-232 during the ChemRisk evaluation. Because of the limited use of radium and thorium at the site and the limited areal extent of potential total radium contamination at the site, total Ra-226 + Ra-228 will not be retained as an AOI.

Table 4.5
Groundwater AOIs Eliminated By Process Knowledge

Analyte	Basis for Eliminating Constituent as a Groundwater AOI
LHSU	
Ammonia (as N)	The highest concentration occurred in background wells compared with IA wells.
Chromium (total)	All the wells, except 0986, with total chromium above the surface water standard have stainless steel well casings.

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Table 4.6
UHSU Groundwater AOIs

Analyte Group	Total or Dissolved	Analyte	Derived CAS	Number of Samples	Number of Detects	Percent Detects	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1 Comparison With Background				AOI Screen 2	AOI Screen 3 Comparison With Lowest Surface Water Standard						AOI Screen 4 Comparison With MCL					AOI Screen 5	AOI Screen 6	Is Constituent an AOI?
										99/99 UTL	Number of Detections Above 99/99 UTL	Frequency of Detection (%) Above the 99/99 UTL	Is the Maximum Concentration Above the 99/99 UTL ?	Appropriate Surface Water Standard Method? (that is, Total or Dissolved)	Site-Specific PQL	Lowest Surface Water Standard	Greater of Lowest Surface Water Standard or Site-Specific PQL	Number of Detections Above Surface Water Standard	Frequency of Detection (%) Above Surface Water Standard	Is the Maximum Concentration Above Lowest Surface Water Standard?	MCL	Greater of MCL or Site-Specific PQL	Number of Detections Above the MCL	Frequency of Detections (%) Above the MCL	Is the Maximum Concentration Above the MCL?	Are There Contiguous Plumes?	Eliminated By Process Knowledge?	
VOC	T	Chloromethane	74-87-3	7424	51	0.69	18000	E	UG/L	-----	-----	-----	-----	Yes	1	5.6	5.6	32	0.43	Yes	6.55	6.55	29	0.39	Yes	Yes	-----	Yes
VOC	T	Benzene	71-43-2	7478	193	2.58	950		UG/L	-----	-----	-----	-----	Yes	1	2.2	2.2	48	0.64	Yes	5	5	30	0.40	Yes	Yes	-----	Yes
VOC	T	1,2-Dichloroethane	107-06-2	7401	151	2.04	1100		UG/L	-----	-----	-----	-----	Yes	1	0.38	1	72	0.97	Yes	5	5	41	0.55	Yes	Yes	-----	Yes
VOC	T	Vinyl Chloride	75-01-4	7457	228	3.06	4190	D	UG/L	-----	-----	-----	-----	Yes	2	0.023	2	147	1.97	Yes	2	2	147	1.97	Yes	Yes	-----	Yes
VOC	T	cis-1,2-Dichloroethene	156-59-2	5604	1595	28.46	9730	D	UG/L	-----	-----	-----	-----	Yes	5	70	70	215	3.84	Yes	70	70	215	3.84	Yes	Yes	-----	Yes
MET	D	Nickel	7440-02-0	4905	1638	33.39	5390		UG/L	23.73	405	8.26	Yes	Yes	20	70.4	70.4	197	4.02	Yes	140	140	110	2.24	Yes	Yes		Yes
MET	D	Arsenic	7440-38-2	4684	814	17.38	88		UG/L	-----	-----	-----	-----	Yes	5	0.018	5	199	4.25	Yes	50	50	6	0.13	Yes	Yes		Yes
VOC	T	Methylene Chloride	75-09-2	7422	1240	16.71	43000	D	UG/L	-----	-----	-----	-----	Yes	1	4.6	4.6	373	5.03	Yes	5	5	353	4.76	Yes	Yes	-----	Yes
VOC	T	1,1-Dichloroethene	75-35-4	7470	1254	16.79	18000		UG/L	-----	-----	-----	-----	Yes	1	7	7	487	6.52	Yes	7	7	487	6.52	Yes	Yes	-----	Yes
WQP	T	Fluoride	16984-48-8	3887	3748	96.42	12550		UG/L	1710.92	401	10.32	Yes	Yes	500	2000	2000	303	7.80	Yes	4000	4000	66	1.70	Yes	Yes	-----	Yes
MET	T	Nickel	7440-02-0	2062	1258	61.01	6460		UG/L	32.68	449	21.77	Yes	Yes	20	100	100	172	8.34	Yes	140	140	126	6.11	Yes	Yes	-----	Yes
MET	T	Chromium	7440-47-3	2063	1200	58.17	10200		UG/L	22.58	539	26.13	Yes	Yes	2	50	50	289	14.01	Yes	100	100	143	6.93	Yes	Yes		Yes
WQP	T	Nitrate/Nitrite (as N)	ConID 184	5894	5360	90.94	17600000		UG/L	5260.65	1682	28.54	Yes	Yes	50	10000	10000	877	14.88	Yes	10000	10000	877	14.88	Yes	Yes	-----	Yes
VOC	T	Chloroform	67-66-3	7442	2168	29.13	64000	E	UG/L	-----	-----	-----	-----	Yes	1	3.4	3.4	1127	15.14	Yes	80	80	285	3.83	Yes	Yes	-----	Yes
VOC	T	Carbon Tetrachloride	56-23-5	7445	1840	24.71	100000	D	UG/L	-----	-----	-----	-----	Yes	1	0.23	1	1468	19.72	Yes	5	5	1205	16.19	Yes	Yes	-----	Yes
VOC	T	Trichloroethene	79-01-6	7471	2952	39.51	220000	E	UG/L	-----	-----	-----	-----	Yes	1	2.5	2.5	1972	26.40	Yes	5	5	1702	22.78	Yes	Yes	-----	Yes
VOC	T	Tetrachloroethene	127-18-4	7465	2916	39.06	100000	BE	UG/L	-----	-----	-----	-----	Yes	1	0.69	1	2201	29.48	Yes	5	5	1544	20.68	Yes	Yes	-----	Yes
RAD	T	Uranium Isotopes		1059	1059	100.00	7220		PCI/L	114.49	44	4.15	Yes	Yes	0.685	10	10	399	37.68	Yes	20.56	20.56	237	22.38	Yes	Yes	-----	Yes

----- Not applicable

The frequency of detection of the analyte concentration above the surface water standard is greater than 0 percent and less than 1 percent.

The frequency of detection of the analyte concentration above the surface water standard is greater than or equal to 1 percent and less than 5 percent.

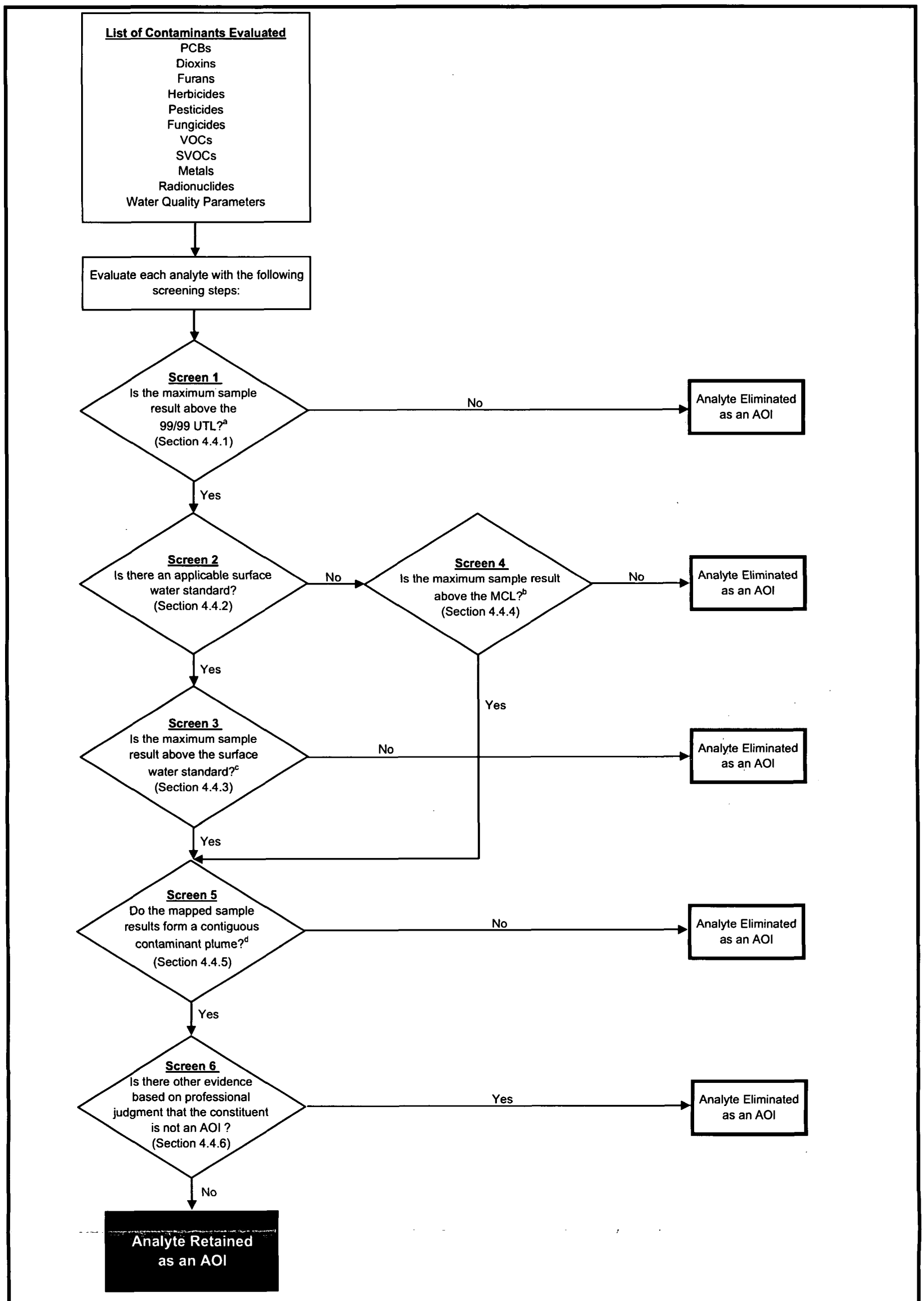
The frequency of detection of the analyte concentration above the surface water standard is greater than 5 percent.

Note: The information presented in this table is listed in order of increasing frequency of detection above the lowest surface water standard or PQL (whichever is higher).

Table 4.7
UHSU Groundwater AOIs and Associated Plume Areas

Area	AOIs
Carbon Tetrachloride Plume (IHSS 118.1)	Carbon tetrachloride, chloroform, chloromethane, methylene chloride, tetrachloroethene
East Trenches	Carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, 1,1-dichloroethene, total chromium
SEP	Nitrate/nitrite (as N), total uranium isotopes, fluoride, total nickel
700 Area Northeast Plume	Carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, total uranium isotopes, nitrate/nitrite (as N)
Mound Site (IHSS 113)	Carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, 1,2-dichloroethane, vinyl chloride, cis-1,2-dichloroethene, 1,1-dichloroethene
Oil Burn Pit #2	chloroform, tetrachloroethene, trichloroethene
903 Pad (IHSS 112)	Carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, nitrate/nitrite (as N)
Ryan's Pit (IHSS 109)	Carbon tetrachloride, chloroform, tetrachloroethene, trichloroethene, total chromium, dissolved and total nickel
IHSS 119.1 (OU1)	Carbon tetrachloride, tetrachloroethene, trichloroethene, 1,1-dichloroethene, total chromium, fluoride, nitrate/nitrite (as N)
Central IA Plume (IA Plume Sources)	Carbon tetrachloride, tetrachloroethene, trichloroethene, 1,1-dichloroethene, vinyl chloride, cis-1,2-dichloroethene
Oil Burn Pit #1	Trichloroethene, vinyl chloride, cis-1,2-dichloroethene
Buildings 443/444	Tetrachloroethene
Building 771	Carbon tetrachloride, trichloroethene, vinyl chloride, 1,1-dichloroethene, total chromium
Building 850	Dissolved nickel
PU&D Yard	Tetrachloroethene, trichloroethene
Present Landfill	Benzene, vinyl chloride, dissolved arsenic

Figure 4.3
Groundwater AOI Screening Process



[a] Background level is the 99/99 UTL reported in the Background Geochemical Characterization Report (DOE 1993). Constituents without background 99/99 UTL values, such as organic compounds and select inorganic and radionuclide constituents, it was assumed that detection of these constituents above the analytical detection limit indicates their presence in the environment. These constituents were carried forward to Screening Step 2.

[b] For analytes without a surface water standard, Screen 4 is performed using the MCL. MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141. Where an MCL for a particular contaminant is lacking, the residential groundwater ingestion-based PRG will apply. If the PQL is higher than the surface water standard, MCL, or PRG, the PQL is used as the comparison value. For simplicity, MCLs, PRGs, and PQLs are hereinafter referred to as MCLs.

[c] Surface water standards are not available for some analytes. For these analytes Screen 4 is performed using MCLs.

[d] Data shown on the maps represent the most recent sample result available at each well. A contiguous plume is defined as three or more adjacent wells with concentrations or activities above either the surface water standard or MCL, whichever is applicable.

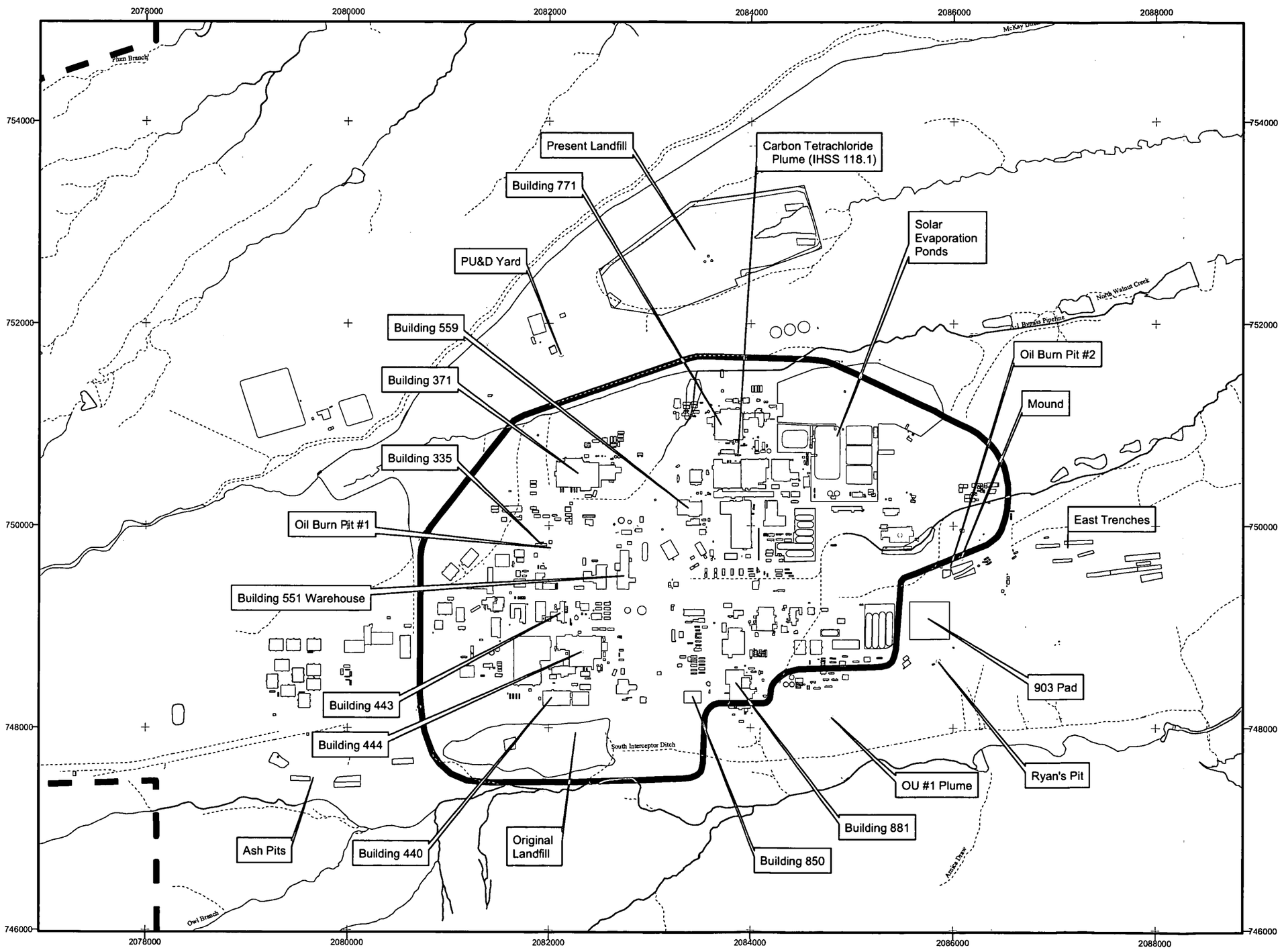


Figure 4.4

Location of Historical Site Features

KEY

- Historical IHSS

Standard Map Features

- Removed building or structure
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary
- IA OU boundary

N
W E
S

0 500 1,000 1,500 Feet

Scale 1:12,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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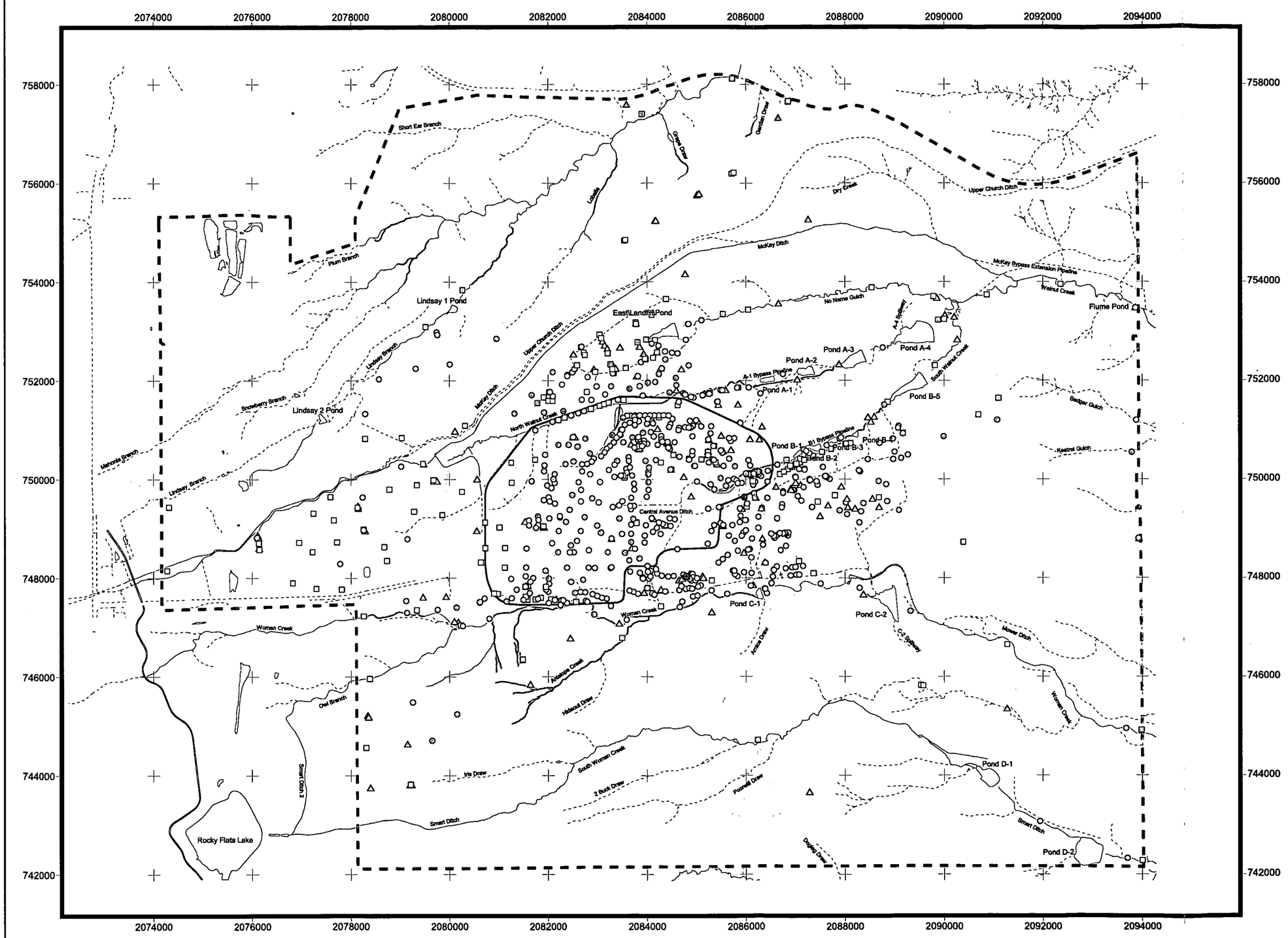

Figure 4.5

1,1-Dichloroethene Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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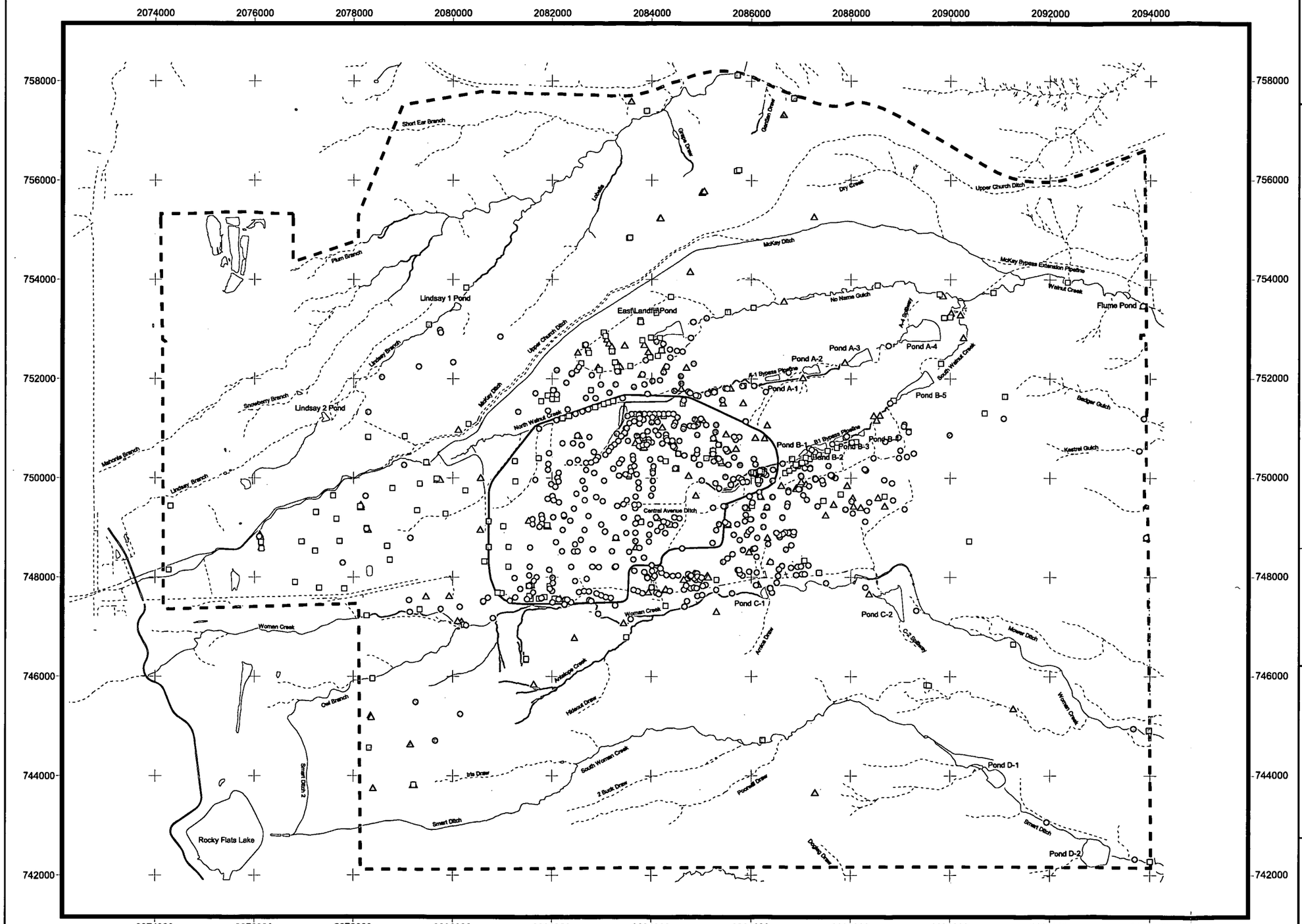

Figure 4.6

1,2-Dichloroethane Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994

- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Not applicable
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N
W E
S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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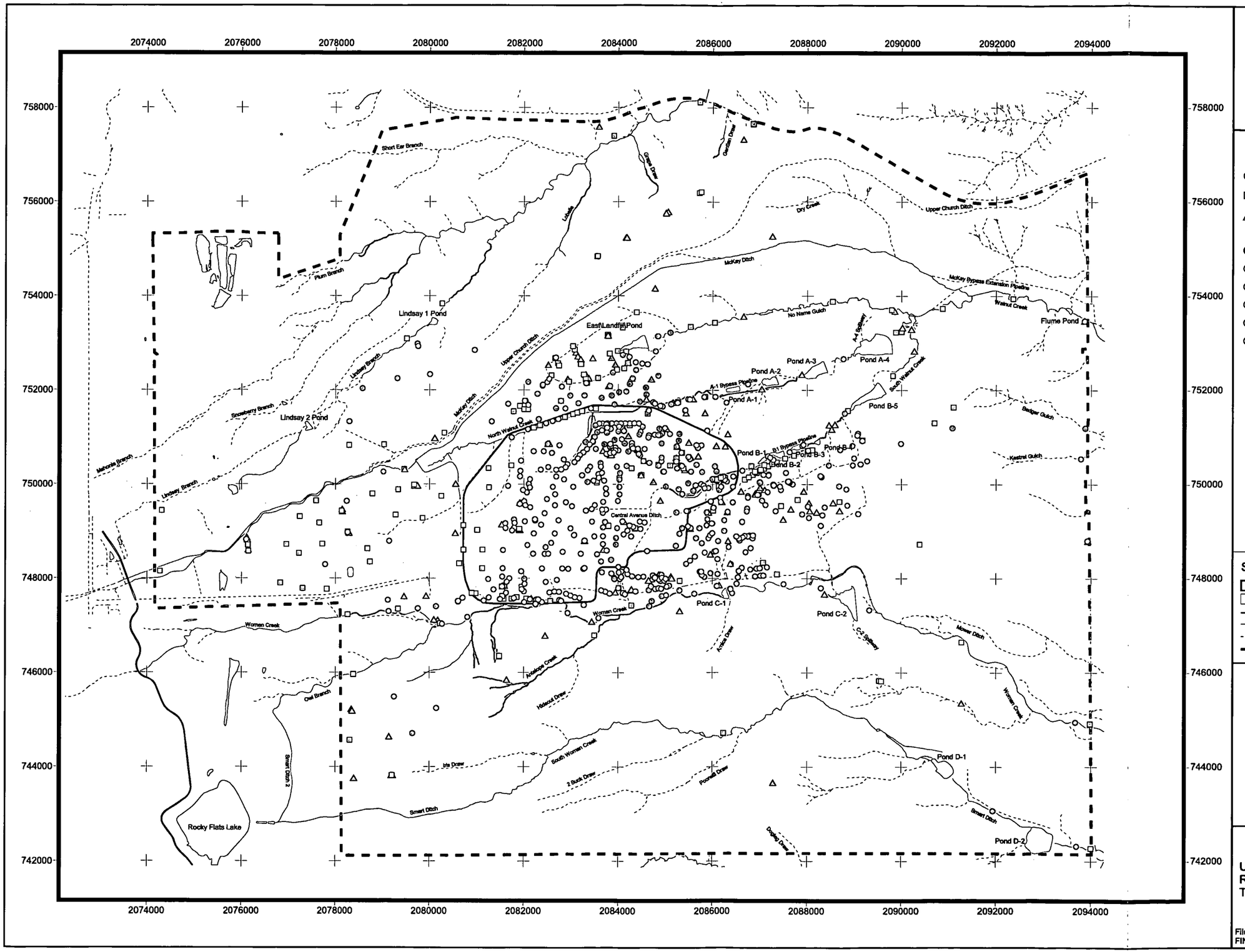

Figure 4.7

Benzene Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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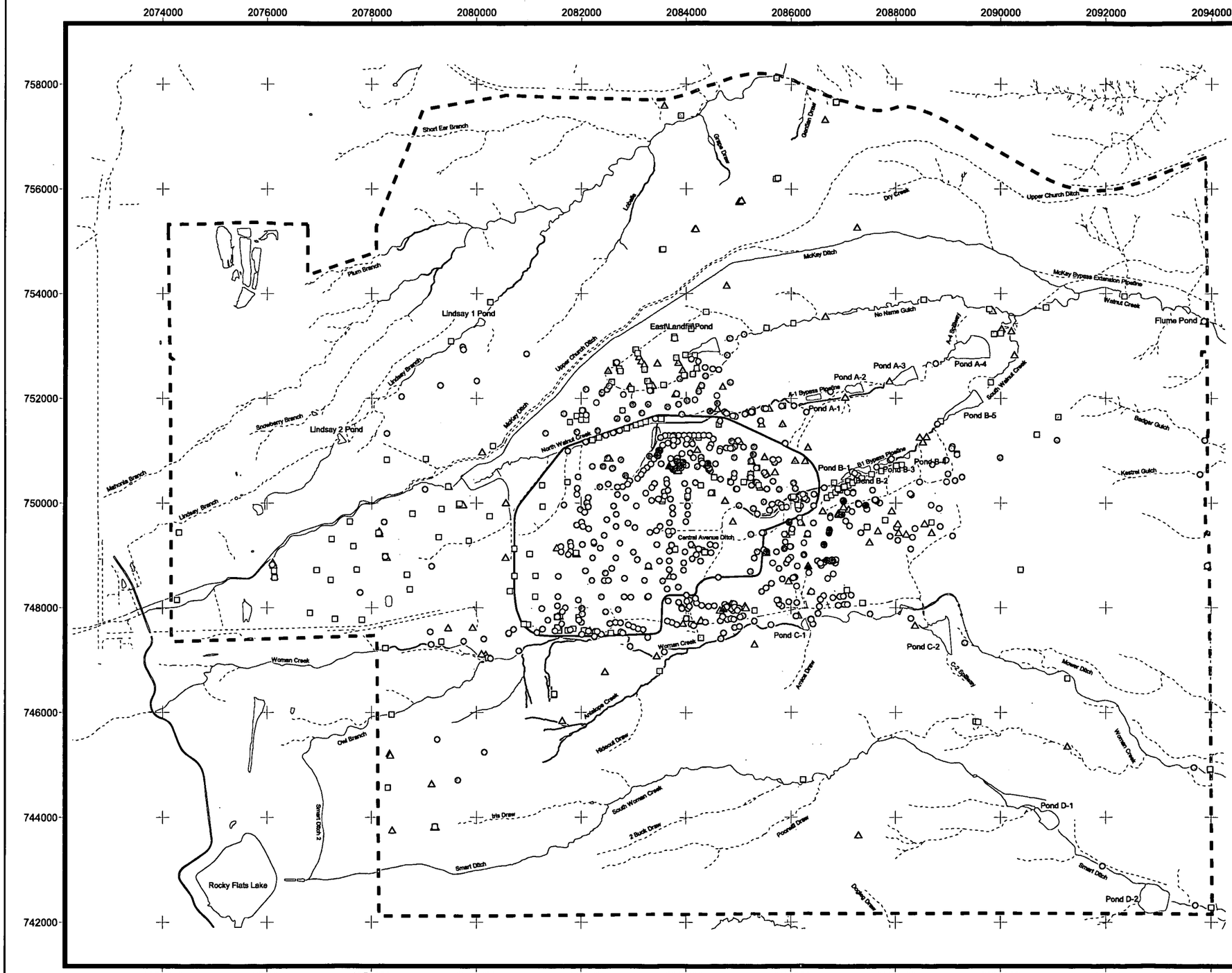

Figure 4.8

Carbon Tetrachloride Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Not applicable
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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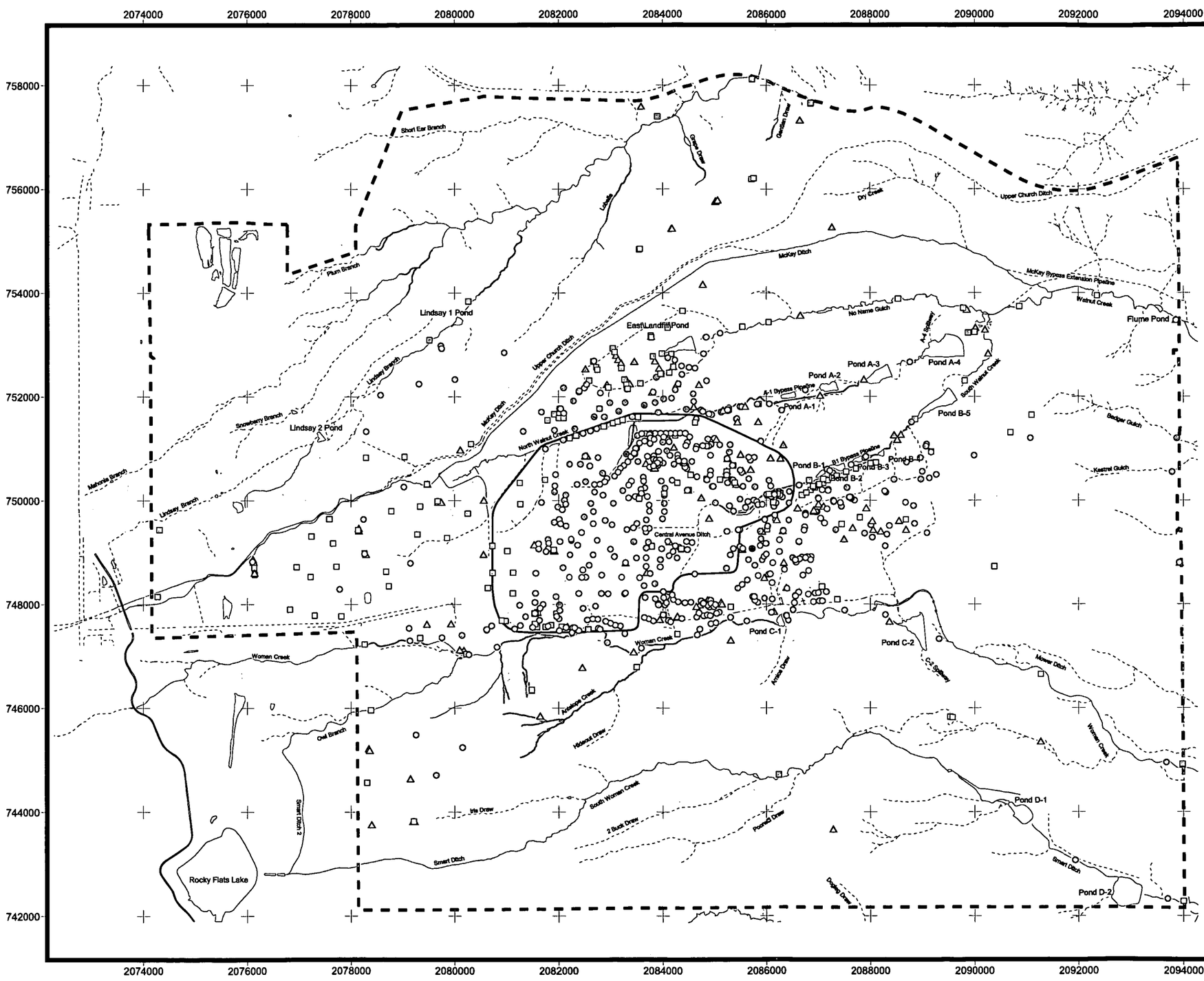

Figure 4.9

Chloroform Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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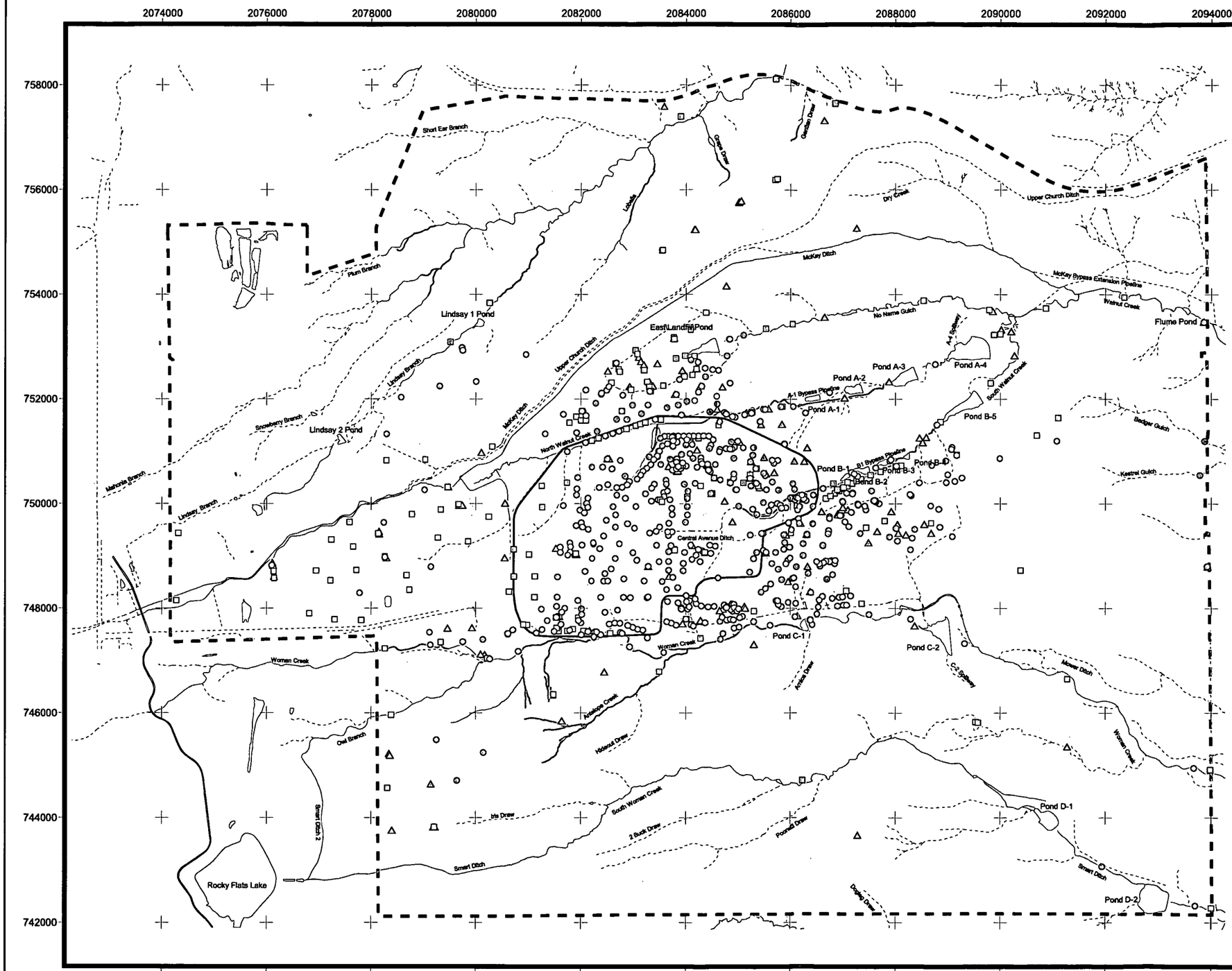

Figure 4.10

Chloromethane Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N
W E
S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental Technology Site

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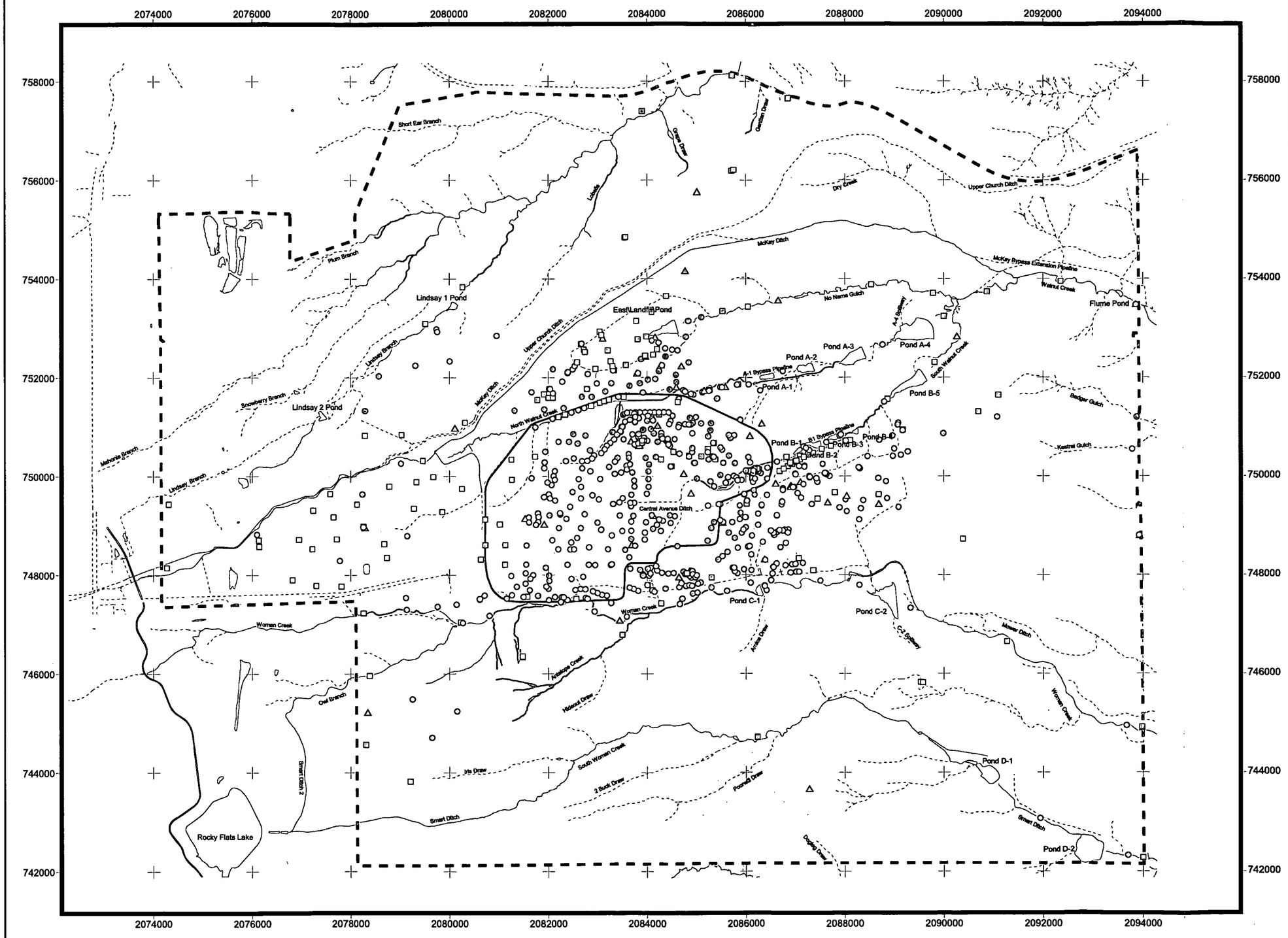

Figure 4.11

cis-1,2-Dichloroethene Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Not applicable
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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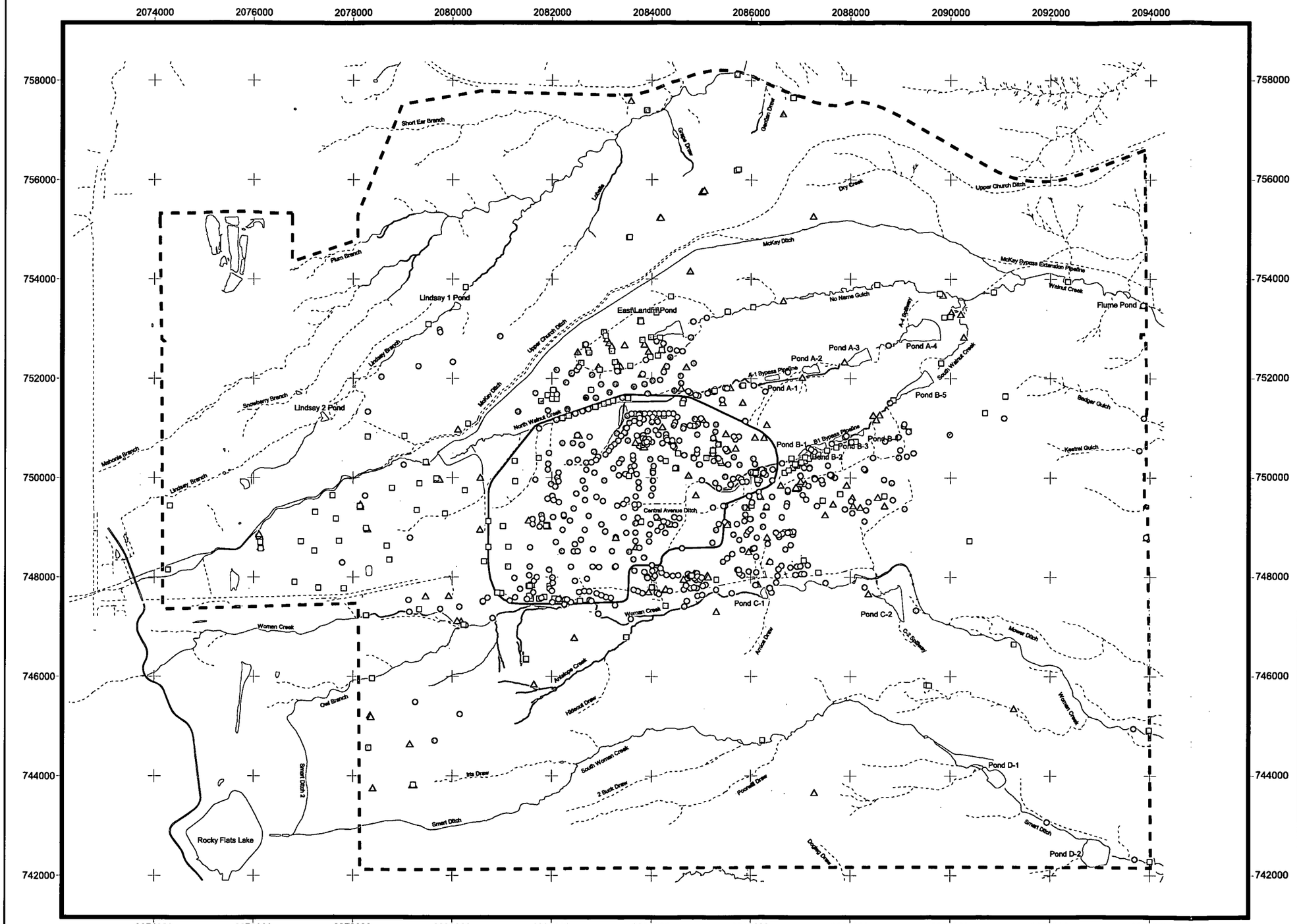

Figure 4.12

Methylene Chloride Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\Groundwater-Reports\FINAL-groundwater-figs.apr

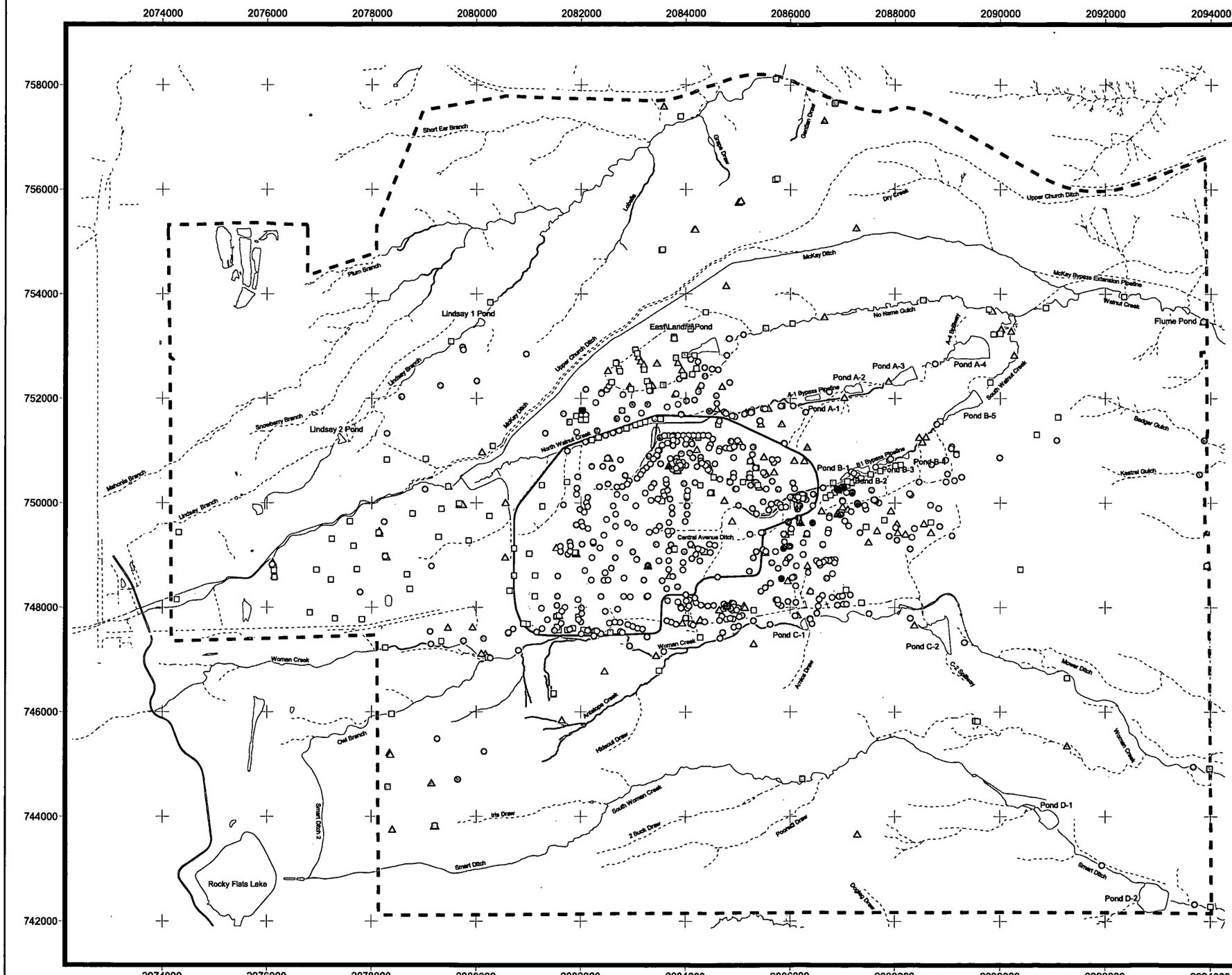

Figure 4.13

Tetrachloroethene Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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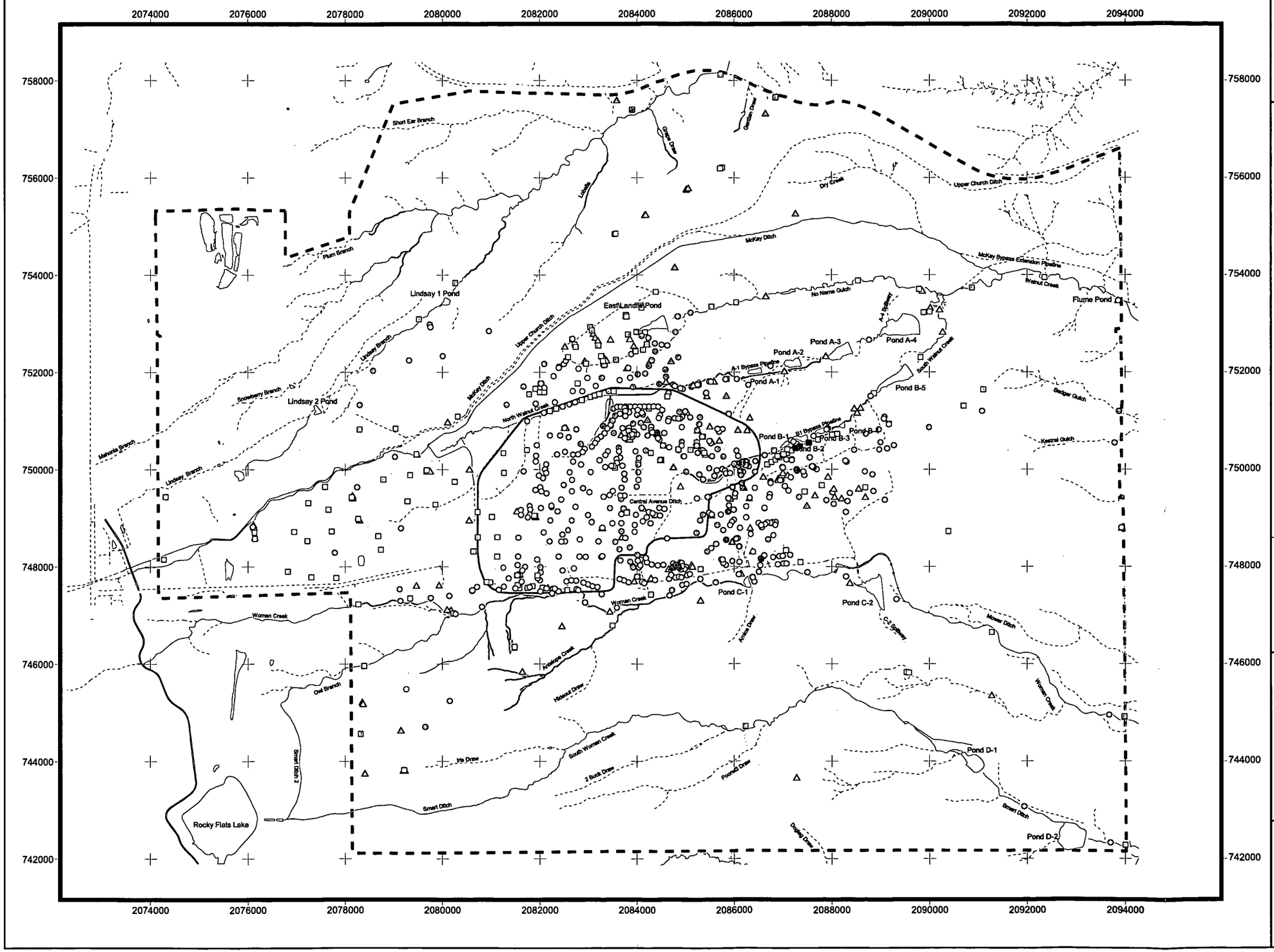

Figure 4.14

Trichloroethene Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental Technology Site

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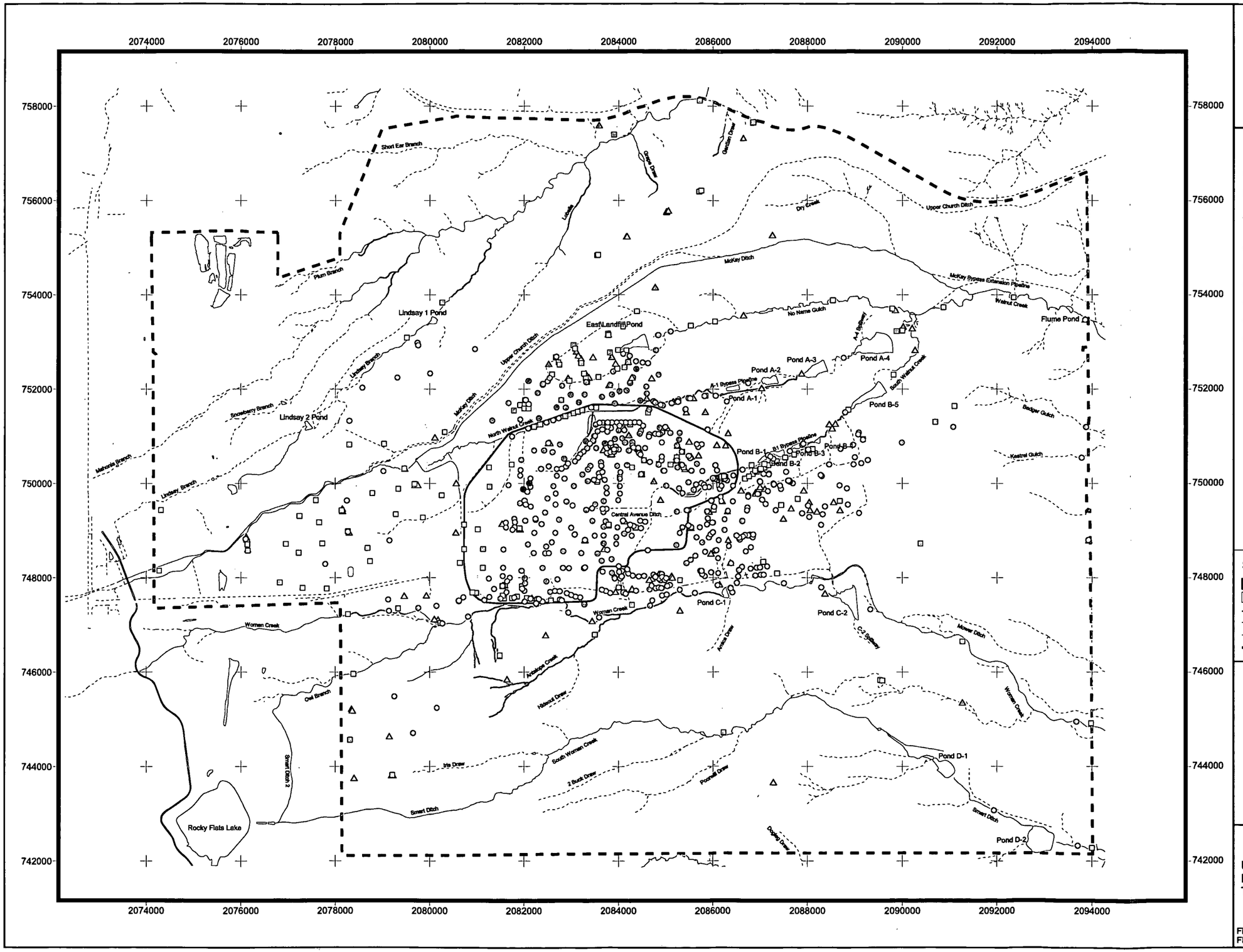

Figure 4.15

Vinyl Chloride Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Not applicable
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\Groundwater-Reports\FINAL-groundwater-figs.apr

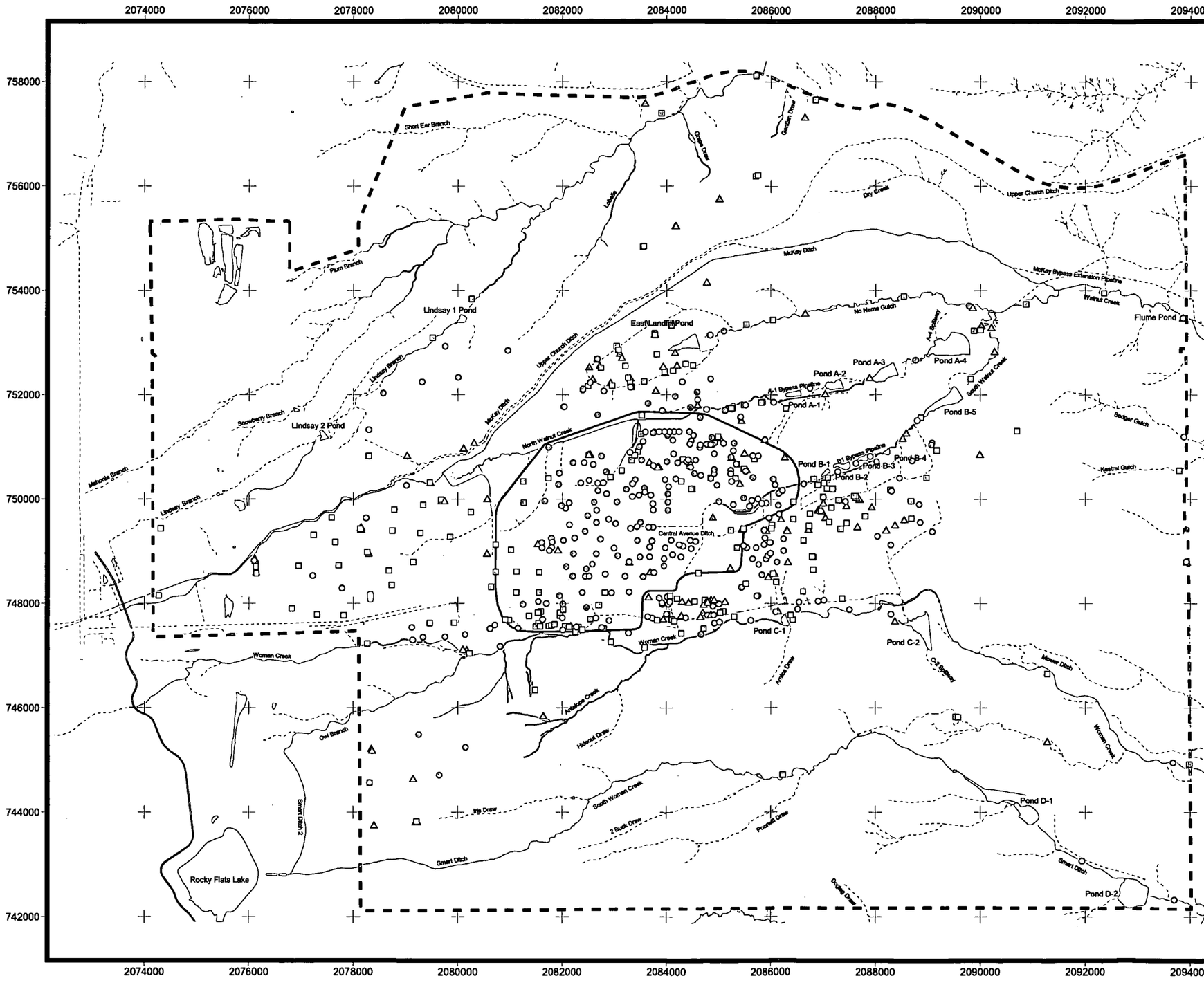

Figure 4.16

Dissolved Arsenic Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Not applicable
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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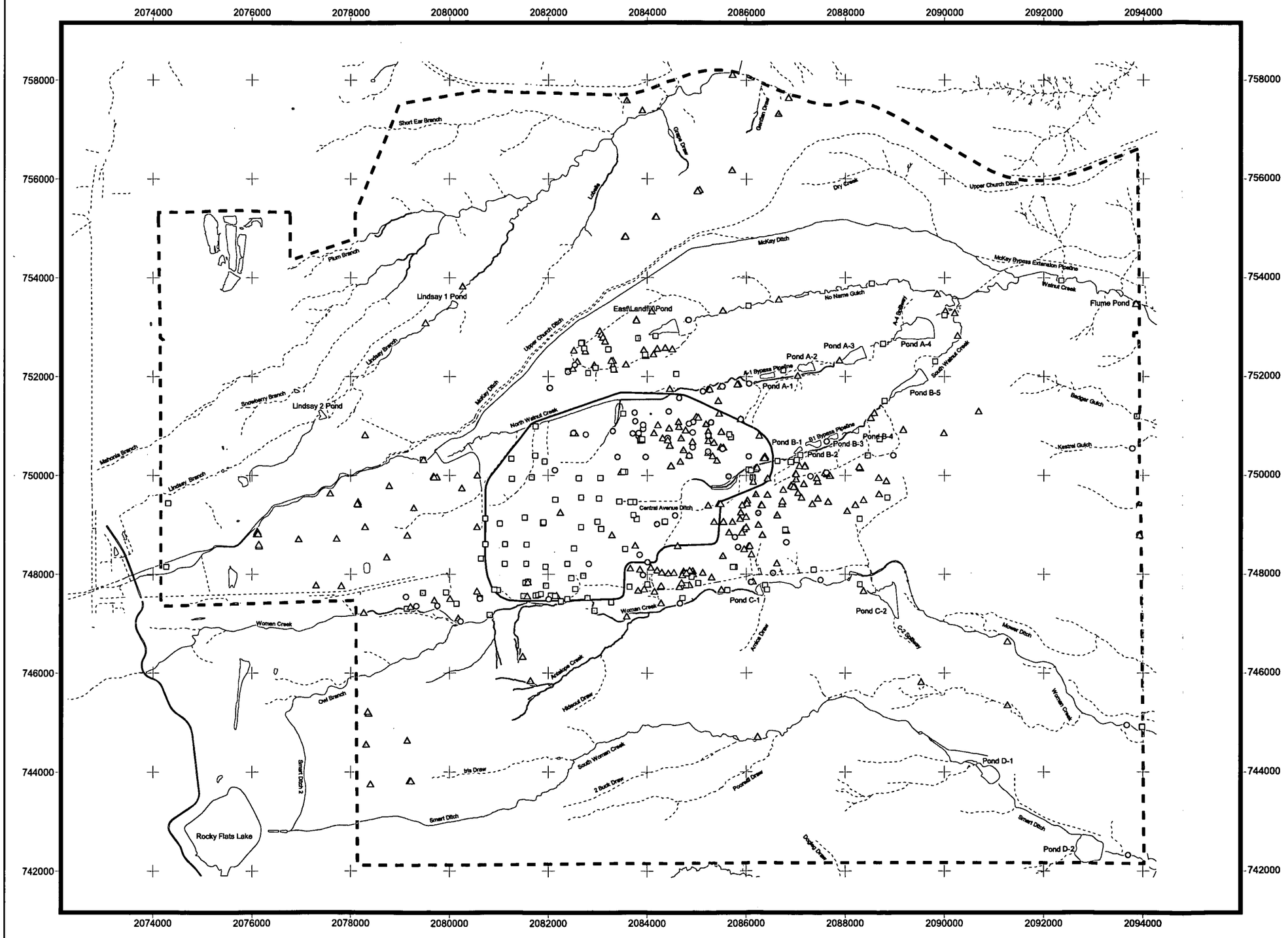

Figure 4.17

Total Chromium Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Detected and <= 99/99 UTL
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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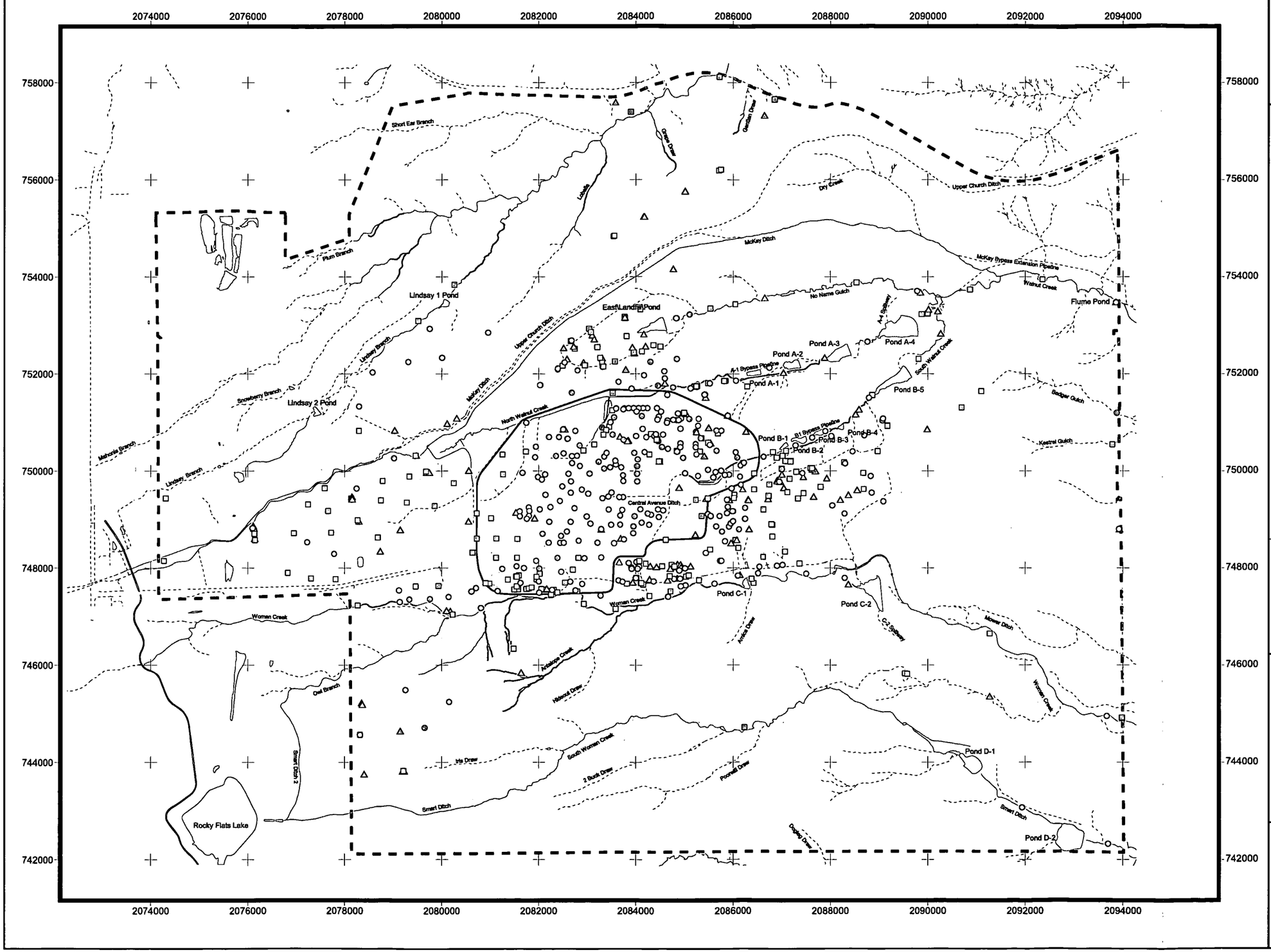

Figure 4.18

Dissolved Nickel Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Detected and <= 99/99 UTL
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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File: W:\Projects\FY2005\Groundwater-Reports\FINAL-groundwater-figs.apr

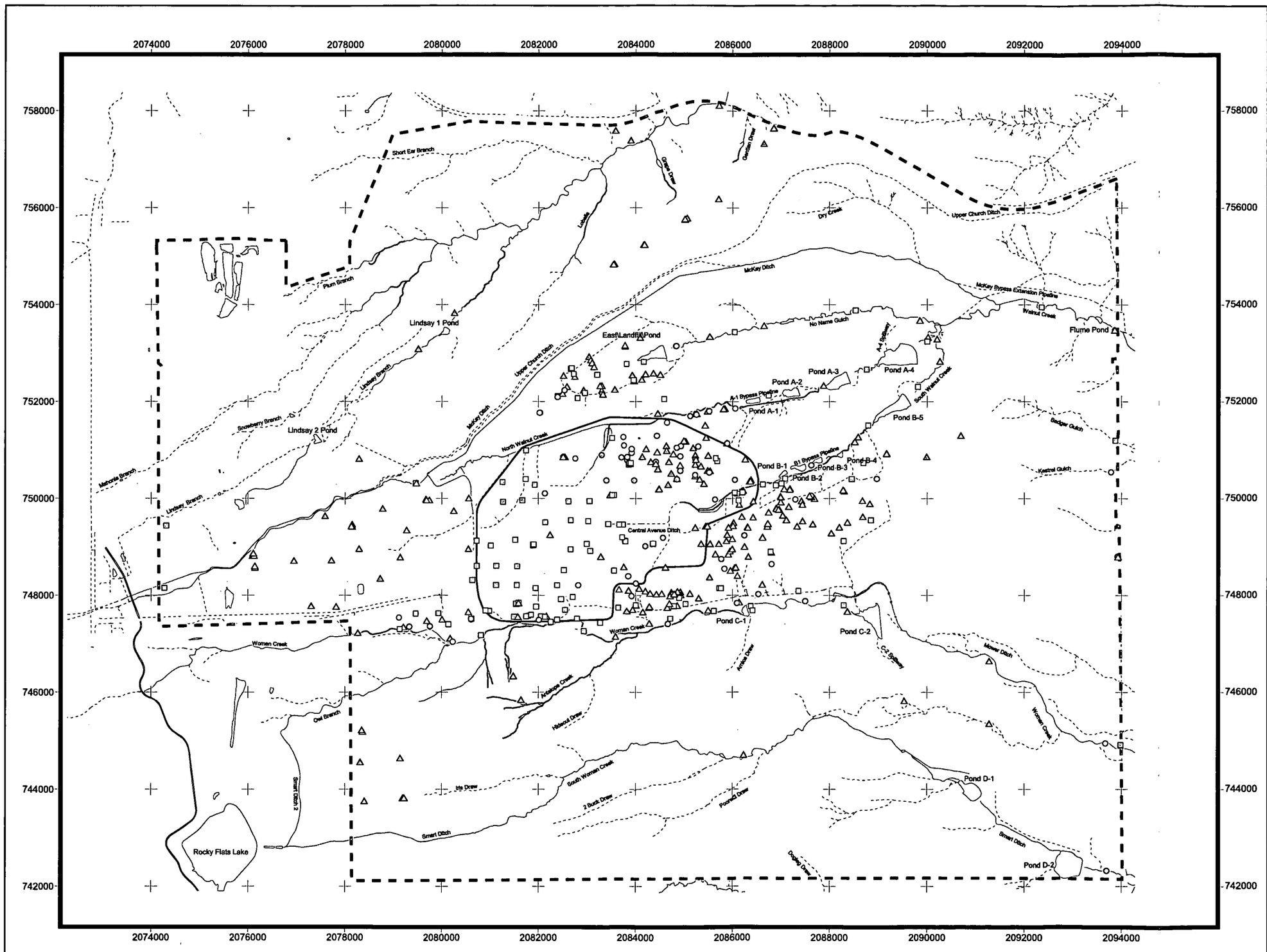

Figure 4.19

Total Nickel Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Detected and <= 99/99 UTL
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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File: W:\Projects\FY2005\Groundwater-Reports\FINAL-groundwater-figs.apr

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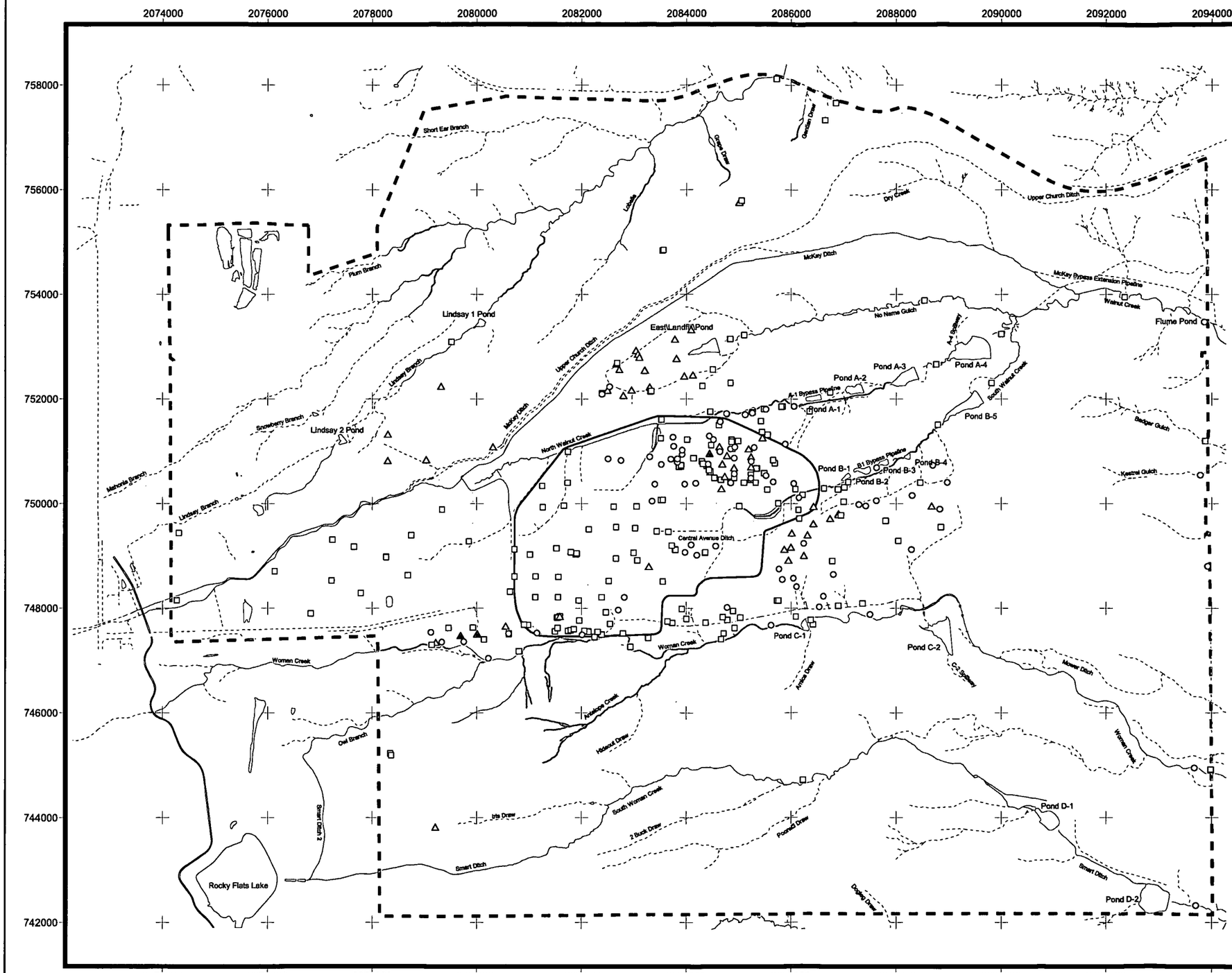
Figure 4.20
Total Uranium Isotopes Activity in UHSU Groundwater



Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100X MCL
- ○ > MCL and <= 100X MCL
- ○ Not applicable
- ○ Not applicable
- ○ Detected and <= 99/99 UTL
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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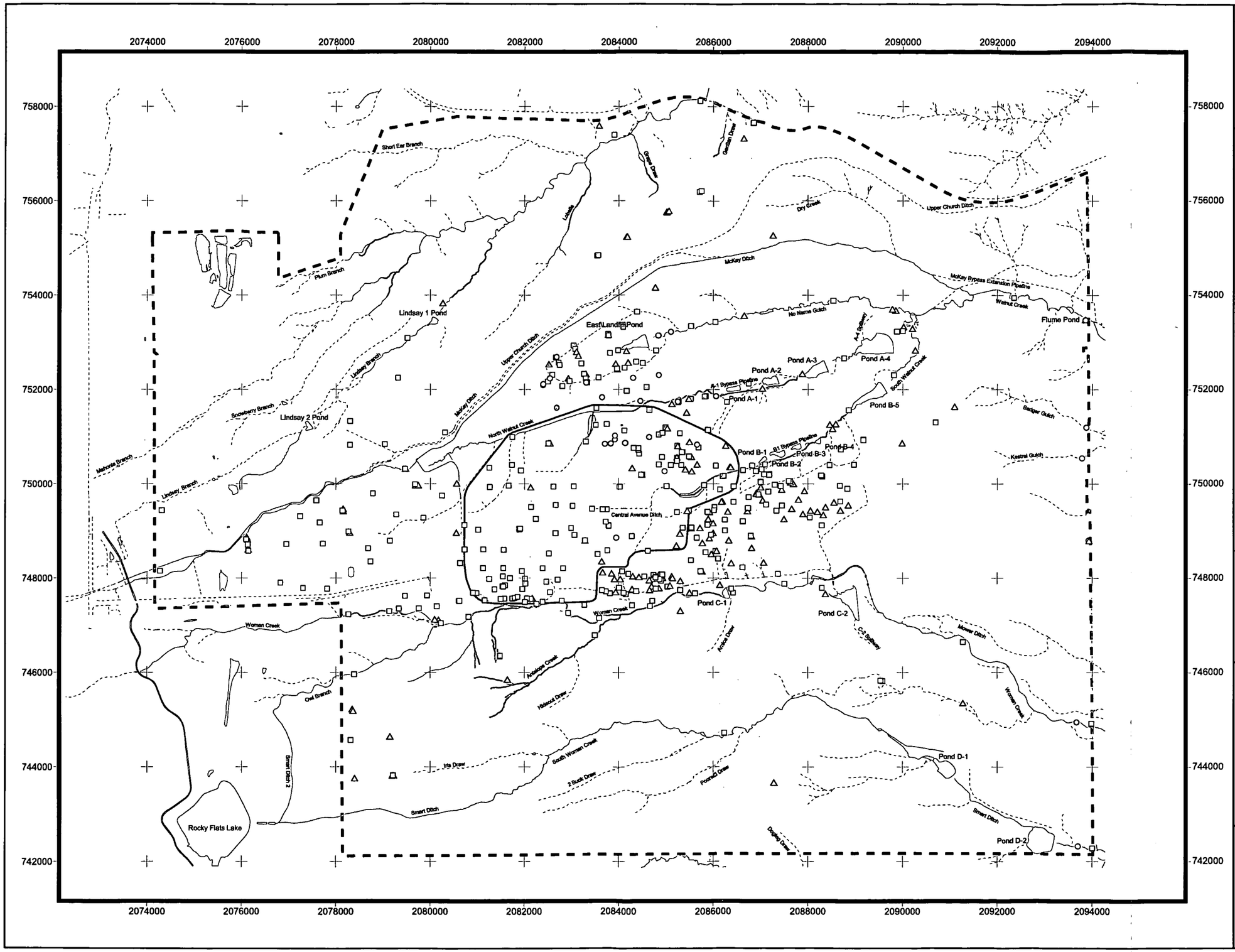

Figure 4.21
Fluoride Concentrations in UHSU Groundwater

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 100x MCL
- > MCL and <= 100x MCL
- > Surface Water Standard and <= MCL
- Detected and <= Surface Water Standard
- Detected and <= 99/99 UTL
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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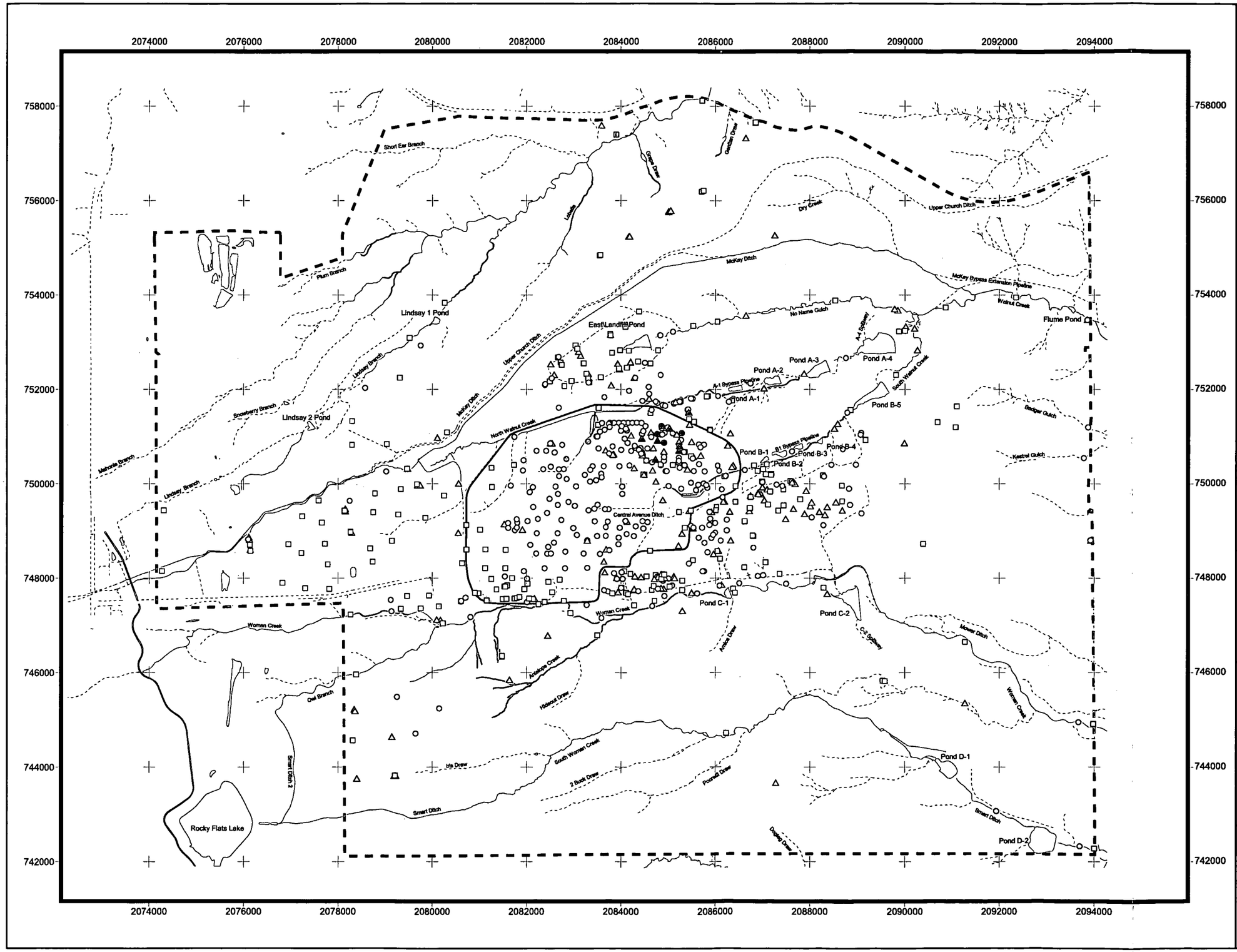

Figure 4.22

Nitrate/Nitrite (as N) Concentrations in UHSU Groundwater

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ● > 100x MCL
- ○ > MCL and <= 100x MCL
- ○ > Surface Water Standard and <= MCL
- ○ Detected and <= Surface Water Standard
- ○ Detected and <= 99/99 UTL
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

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5.0 NATURE AND EXTENT OF SURFACE WATER AND SEDIMENT CONTAMINATION

5.1 Introduction

The purpose of this section is to define the current nature and extent of surface water and sediment analytes of interest (AOIs) at the Rocky Flats Environmental Technology Site (RFETS or site) after the accelerated actions are complete. Surface water AOIs are those analytes that are present above the background mean plus two standard deviations (M2SD) and greater than a 1 percent frequency of detection above the surface water standard[1] or practical quantitation limit (PQL) if greater than the standard. Sediment AOIs are those analytes that are present above the background M2SD and preliminary remediation goals (PRGs) for a wildlife refuge worker (WRW) based on a target excess carcinogenic risk of 1×10^{-6} or a hazard quotient (HQ) of 0.1. Surface water and sediment AOIs will be further evaluated in Section 7.0.

Data used in this section are the result of previous investigations conducted at the site, from sitewide sampling programs, samples collected after accelerated actions were implemented, and data collected during the sitewide Remedial Investigation/Feasibility Study (RI/FS) to support the Comprehensive Risk Assessment (CRA). Given that water quality and chemical loading conditions are dynamic and affected by variables such as site releases, accelerated action efforts, flow, and so forth, it was determined that data reflective of more current conditions are representative of surface water quality for the evaluation of AOIs. Therefore, the surface water nature and extent is based on data collected between January 1, 2000 and July 31, 2005. The sediment nature and extent is based on data collected between June 28, 1991,[2] and July 31, 2005.

A brief chronology of surface water and sediment monitoring at RFETS is presented below to provide a historical perspective of surface water and sediment characterization and monitoring at the site.

5.2 Surface Water and Sediment Monitoring at RFETS

Surface water monitoring has been conducted at RFETS throughout the site's history, from 1952 to the present. Data were initially collected for effluent monitoring of Plant releases and reservoir and drinking water monitoring. Subsequently, surface water and sediment data have been reported in numerous RFETS reports and were warehoused in the Rocky Flats Environmental Database System (RFEDS) and its successor, the Soil Water Database (SWD). Table 5.1 provides a summary of surface water and sediment monitoring locations and sampling frequencies.

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[1] See Section 5.4.1 for source of surface water quality standards for RFETS.

[2] This date correlates to approved work plans and Sampling and Analysis Plans (SAPs) developed pursuant to the 1991 Interagency Agreement (IAG).

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Past data were collected under a variety of programs. These programs included, but were not limited to:

- Sitewide characterization (for example, Operable Unit [OU] Resource Conservation and Recovery Act [RCRA] Facility Investigations [RFI]/Remedial Investigations [RIs]);
- Accelerated actions and interim measures/interim remedial actions (IM/IRAs);
- National Pollutant Discharge Elimination System (NPDES) sampling;
- Event-related surface water monitoring;
- Automated surface water monitoring;
- Ponds A-4, B-5, and C-2 predischarge sampling;
- Building 891 treatment facility effluent monitoring;
- Incidental waters;
- Remediation projects;
- Groundwater plume treatment system effluent monitoring; and
- Other special projects.

An Integrated Monitoring Plan (IMP) is required under the Rocky Flats Cleanup Agreement (RFCA) to implement environmental media monitoring programs at the site and serves as the current surface water and sediment monitoring plan for RFETS. The IMP outlines the monitoring goals for surface water and sediment and describes the various components of the surface water and sediment monitoring program. The IMP, originally published in May 1997, replaced the numerous permit, event-related, and characterization surface water monitoring programs conducted at the site. Since Fiscal Year (FY) 2004, the IMP has been updated quarterly (as needed) and annually to reflect periodic changes to the monitoring programs.

IMP updates include input derived from consultation with the U.S. Environmental Protection Agency (EPA), the Colorado Department of Public Health and the Environment (CDPHE), cities, and stakeholders. This consultative process determined the locations of new surface water and sediment stations, analytical suites for surface water and sediment, and the overall design of the current monitoring network. Agency and community input was obtained by the U.S. Department of Energy (DOE), and DOE strategies were transmitted to the communities through quarterly information exchange and Water Working Group meetings. In addition, IMP meetings were frequently scheduled to address the evolving nature of the IMP as the site moved toward closure. City and stakeholder participants include, but are not limited to, representatives of the City and County of Broomfield, City of Arvada, City of Westminster, City of Northglenn, City of Thornton, Rocky Flats Coalition of Local Governments (RFCLoG), and Rocky Flats Citizens Advisory Board (RFCAB).

The IMP was developed to guide the majority of surface water monitoring at RFETS. The IMP was developed using the EPA data quality objective (DQO) process. The DQO process is a structured decision-making process that requires the identification of and agreement on decisions for which data are required. This process resulted in multiple surface water monitoring objectives detailed in the IMP. Although surface water data continue to be collected outside of the IMP by special projects, much of the surface water monitoring at the site since October 1996 has been covered by the following objectives:

- Source location monitoring to identify potential "new sources."
- Ad hoc monitoring for special temporary projects such as the Actinide Migration Evaluation (AME), Site-Wide Water Balance, agency studies (for example, CDPHE uranium inductively-coupled plasma/mass spectrometry [ICP/MS] study), and operational monitoring (for example, footing drain monitoring).
- Indicator parameter monitoring to provide information for special data assessment.
- Incidental waters monitoring to facilitate proper disposition of water collected in utility pits, excavations, secondary containment, and so forth.
- Sanitary system monitoring including:
  - Internal wastestream characterization to characterize routine internal wastestreams to meet NPDES permit requirements.
  - Monitoring discharges to the Wastewater Treatment Plant (WWTP) to determine authorization for nonroutine wastestreams to be discharged to the WWTP.
  - WWTP collection system protective monitoring to ensure inflows will not disrupt proper WWTP operation.
- WWTP collection system flow monitoring to evaluate for abnormal conditions.
  - CDPHE WWTP influent radiological and metals monitoring to track loads and concentrations.
- Performance monitoring of specific projects to ensure effectiveness of administrative and engineering controls (for example, erosion controls).
- Performance monitoring for the Mound, East Trenches, and Solar Pond Plume Treatment Systems to evaluate system operation.
- NPDES permit monitoring as specified by the permit.
- New source detection monitoring to evaluate for statistically significant changes in water quality for water leaving the Industrial Area (IA) and entering the site retention ponds.
- Stream segment 5/Point of Evaluation (POE) monitoring to evaluate a specific set of constituents against RFCA action levels (ALs), specifically for locations GS10, SW027, and SW093.
- Predischarge monitoring to confirm that retained pond waters meet stream standards prior to discharge.

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- Stream segment 4/Point of Compliance (POC) monitoring to evaluate a specific set of constituents against RFCA AL,s specifically for locations GS01, GS03, GS08, GS11, and GS31.
- Non-POC monitoring at Indiana Street to provide supplemental data to CDPHE.
- Monitoring uncharacterized discharges only required when other monitoring is not performed due to unusual conditions such as extreme flood events (similar to ad hoc monitoring).
- Community assurance off-site monitoring.
- Buffer Zone (BZ) hydrologic monitoring in support of watershed and ecological health evaluation.

5.3 Surface Water and Sediment Data

5.3.1 Data Source

Surface water and sediment data used in this evaluation were extracted from the Soil Water Database (SWD) using procedures developed to support the CRA. Surface water data extracted consisted of analytical records that represent the time period from January 1, 2000 to July 31, 2005. Sediment data extracted consisted of analytical records that represent the time period from June 28, 1991 to July 31, 2005. Only data deemed "CRA Ready = Yes" were used in this evaluation. Additional data reduction steps for surface water and sediment are included in Attachment 1 and Attachment 2, respectively.

Surface water data have been collected from 404 locations (Figure 5.1) and sediment data from 369 locations (Figure 5.2) in four drainage basins (Figure 5.3) that include Rock Creek, Walnut Creek (including the McKay Ditch), Woman Creek, and Lower Smart Ditch since June 28, 1991. These records include analytical results for pesticides, herbicides, fungicides, aroclors (polychlorinated biphenyls [PCBs]), dioxins, furans, semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), total and dissolved metals, total and dissolved radionuclides, and water quality parameters.

Data that were used to evaluate the surface water and sediment nature and extent included 41,442 and 44,511 records, respectively. These data included 311 surface water and 525 sediment records for tentatively identified compounds (TICs). TICs found in the surface water and sediment data are organic compounds that do not have surface water standards or WRW PRGs and were not further evaluated. Specific data used for evaluation of the surface water and sediment nature and extent are described below and presented on a compact disk read-only memory (CD ROM) in Attachments 1 (surface water) and 2 (sediment).

5.3.2 Data Adequacy and Quality

Surface water and sediment data adequacy and quality of the data used in to evaluate surface water and sediment nature and extent were evaluated in Appendix A, Volume 2, Attachments 2 and 3. The distribution of data, both spatially and temporally, was

assessed to ensure that the nature and extent of contamination is well characterized. Data quality was assessed using a standard precision, accuracy, representativeness, completeness, and comparability (PARCC) parameter analysis (EPA 1999, 2001, 2005). The Data Quality Assessment (DQA) presented in Appendix A, Volume 2, Attachment 2 is based on an evaluation of site-wide field and laboratory control samples (LCs). The results of the Data Adequacy Assessment are presented in the Data Adequacy Report (Appendix A, Volume 2, Attachment 3). Data used to evaluate surface water and sediment nature and extent met data adequacy and data quality criteria for the CRA.

5.4 Identification of Surface Water AOIs

To identify surface water AOIs, analytical data from January 1, 2000 to July 31, 2005 were evaluated in the surface water nature and extent. The analytes evaluated are listed in Table 5.2. The constituents highlighted in color shown in Table 5.2 identify those constituents that have a frequency of detection less than 1 percent (green), between 1 percent and 5 percent (yellow), and greater than 5 percent (orange) above the lowest surface water standard or PQL (whichever is higher). Surface water constituents were screened and eliminated or retained as AOIs using the screening approach shown on Figure 5.4. Analytes eliminated or retained by process knowledge are listed in Table 5.3. The screening approach is described in the following sections.

5.4.1 Surface Water AOI Screening and Identification Process

5.4.1.1 AOI Screening Step 1 – Determination of Surface Water Standard

To evaluate the potential for impacts to surface water quality, AOI Screening Step 1 determines whether a surface water standard exists for each constituent. The surface water quality standards are the RFETS site-specific and statewide standards listed in 5 Code of Colorado Regulations (CCR) 1002:

- Statewide surface water radioactive materials standards in Section 31.11(2);
- Statewide surface water interim organic pollutant standards in Section 31.11(3); and
- Site-specific surface water quality standards for segments 4a, 4b, and 5 of Big Dry Creek in Section 38.6 of the South Platte Basin Classifications and Standards.

The surface water standard is defined as the greater of the lowest surface water standard or the PQL. Basic surface water standards considered include water supply, water+fish, fish ingestion, acute aquatic, chronic aquatic, aquatic life class 2, agriculture, and site-specific surface water standards for Walnut and Woman Creeks.

For constituents that have a surface water standard and appropriate methodology (that is, total versus dissolved analysis [Table 5.2]), the constituent is carried forward to AOI Screening Step 2. Constituents that do not have a surface water standard are eliminated as an AOI.

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5.4.1.2 AOI Screening Step 2 – Background Comparison

Surface water analyte results were compared against the background M2SD values presented in Appendix A, Volume 2, Attachment 5 where available. Background values are not available for organic constituents and other select inorganic and radionuclide constituents. Detection of these constituents above the detection limits are assumed to indicate their presence in the environment. Laboratory qualifier codes were used to identify whether a constituent is detected.

In AOI Screening Step 2, surface water analytical results are compared with the corresponding background M2SD value. For those analytes where sample results are below or equal to the corresponding background M2SD, the analyte is eliminated as a potential AOI. Analytes that have at least one sample result above the background M2SD value are carried forward to AOI Screening Step 3. For analytes that do not have a background M2SD (for example, organic constituents) this screening step is skipped and the analyte proceeds to AOI Screening Step 3.

5.4.1.3 AOI Screening Step 3 – Surface Water Standard Comparison

In AOI Screening Step 3, surface water analyte results are compared with the corresponding surface water standard. For surface water analytes where all sample results are below or equal to the surface water standard, the analyte is eliminated as an AOI. Surface water analytes that have at least one sample result above the surface water standard are retained and proceed to AOI Screening Step 4.

5.4.1.4 AOI Screening Step 4 – 1 Percent Frequency of Detection Screen

For each surface water analyte that passes AOI Screening Step 3 and has a frequency of detection above the surface water standard greater than 1 percent, the analyte is carried forward to AOI Screening Step 5. For analytes whose frequency of detection above the surface water standard is less than or equal to 1 percent, the analyte is eliminated as an AOI.

Elimination of the less-than-1-percent-frequency analytes is based on application of Colorado's guidance on data requirements and interpretation methods used to establish existing water quality in Colorado Water Quality Control Commission (Colorado WQCC) rulemaking proceedings (Colorado WQCD, 1993, 2004, 2005). In particular, data should be ranked and the 85^{th} percentile is used as the indicative value for dissolved parameters, while the 50^{th} percentile is indicative of totals. Given the large number of samples for these analytes, more than 99 percent of the data below the identified standard is adequately representative to show that these contaminants do not adversely impact surface water quality.

5.4.1.5 AOI Screening Step 5 – Process Knowledge Evaluation

AOI Screening Step 5 involves the determination of whether an AOI should be retained or eliminated based on process knowledge or other criteria involving professional judgment. The process knowledge evaluation involves an assessment of contaminants

that are not reasonably expected to be AOIs based on historical site process knowledge (DOE 2005) even though they may equal or exceed the surface water standard. Process knowledge alone is not used to eliminate a constituent as an AOI. Other analyte criteria such as its areal distribution relative to RFETS activities, its proximity to contaminant sources, accelerated actions performed to remove a contaminant source, and its natural occurrence and distribution in the environment were also considered when evaluating whether to retain or eliminate a constituent as an AOI.

5.4.2 Results of Surface Water AOI Screening

Based on the AOI screening process shown on Figure 5.4, 19 surface water AOIs were retained and included 7 VOCs (carbon tetrachloride, chloroform, cis-1,2-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride), 6 metals (dissolved aluminum and total beryllium, chromium, lead, nickel, and zinc), 5 radionuclides (total americium-241, gross alpha, gross beta, plutonium-239/240, and uranium isotopes), and 1 water quality parameters (nitrate/nitrite (as N). The constituents highlighted in color in Table 5.4 identify those constituents that have a frequency of detection between 1 percent and 5 percent (yellow) and greater than 5 percent (orange) above the lowest surface water standard or PQL (whichever is higher). Table 5.5 lists the surface water AOIs by drainage basin.

The frequency of detection for the surface water AOIs ranges between 1 to less than 5 percent (11 constituents), and greater than 5 percent (8 constituents). The AOIs identified and retained in surface water are listed in Table 5.4 along with summary statistics for each constituent. Figure 5.5 through Figure 5.23 show the nature and extent of surface water AOIs. Surface water analytes eliminated as AOIs based on process knowledge or professional judgment are listed in Table 5.3. The extent of other surface water constituents evaluated in the nature and extent that were not retained as AOIs are included on a CD ROM as Figures A1.1 through A1.136 in Attachment 1.

5.4.2.1 PCBs, Dioxins, and Furans

No PCB, dioxin, or furan AOIs were identified in surface water. Table 5.2 summarizes the PCBs, dioxins, and furans analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of PCBs, dioxins, and furans that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.1 through A1.7).

5.4.2.2 Pesticides, Herbicides, and Fungicides

No pesticide, herbicide, or fungicide AOIs were identified in surface water. Table 5.2 summarizes the pesticides, herbicides, and fungicides analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of pesticides, herbicides, and fungicides that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.8 through A1.9).

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5.4.2.3 Semivolatile Organic Compounds (SVOCs)

No SVOC AOIs were identified in surface water. Table 5.2 summarizes the SVOCs analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of SVOCs that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.10 through A1.64).

5.4.2.4 Volatile Organic Compounds (VOCs)

Seven VOC AOIs (carbon tetrachloride, chloroform, cis-1,2-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride) were identified in surface water. Table 5.2 summarizes the VOCs analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of VOCs that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.65 through A1.97). Table 5.4 lists the seven VOCs retained as surface water AOIs. Section 5.6.3.1 and Figure 5.5 through Figure 5.11 present further discussion of the nature and extent of VOC AOIs in surface water.

5.4.2.5 Metals

Six metal AOIs (dissolved aluminum and total beryllium, chromium, lead, nickel, and zinc) were identified in surface water. Table 5.2 summarizes the metals analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of metals that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.98 through A1.125). Table 5.4 lists the six metals retained as metal AOIs. Section 5.6.3.2 and Figure 5.12 through Figure 5.16 present further discussion of the nature and extent of metal AOIs in surface water.

5.4.2.6 Radionuclides

Five radionuclide AOIs (total americium-241, gross alpha, gross beta, plutonium-239/240, and uranium isotopes) were identified in surface water. Table 5.3 summarizes the radionuclides analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of radionuclides that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.126 through A1.131). Table 5.4 lists the five radionuclides retained as AOIs. Section 5.6.3.3 and Figure 5.17 through Figure 5.21 present further discussion of the nature and extent of radionuclide AOIs in surface water.

5.4.2.7 Water Quality Parameters

One water quality parameter AOI (nitrate/nitrite [as N]) was identified in surface water. Table 5.3 summarizes the water quality parameters analyzed and reported in the data evaluated, but not retained as surface water AOIs. The nature and extent of water quality parameters that were not identified as AOIs are shown on the extent maps in Attachment 1 (Figures A1.132 through A1.136). Table 5.4 lists the one water quality parameter retained as an AOI. Section 5.6.3.4 and Figure 5.23 present further discussion of the nature and extent of water quality parameters AOIs in surface water.

5.5 Identification of Sediment AOIs

To identify sediment AOIs, analytical data from June 28, 1991 to July 31, 2005 were evaluated in the sediment nature and extent. The analytes evaluated are listed in Table 5.2. The constituents highlighted in color in Table 5.2 identify those constituents that have a frequency of detection [less than 1 percent (green), between 1 percent and 5 percent (yellow), and greater than 5 percent (orange)] above the WRW PRG. Sediment constituents were screened and eliminated or retained as AOIs using the screening approach shown on Figure 5.4. Analytes eliminated or retained by process knowledge are listed in Table 5.3. The screening approach is described in the following sections.

5.5.1 Sediment AOI Screening and Identification Process

5.5.1.1 AOI Screening Step 1 – Preliminary Remediation Goal (PRG) Identification

To evaluate the potential for impacts to sediments, AOI Screening Step 1 determines whether a wildlife refuge worker (WRW) PRG exists for the sediment constituent. The WRW PRG values used to compare the sediment results were developed in the CRA for a WRW based on a target excess carcinogenic risk of 1×10^{-6} or a HQ of 0.1. Constituents without a PRG are eliminated as an AOI and are discussed in the uncertainty sections of Appendix A, Volumes 3 through 14. Constituents that have a PRG are carried forward to Screening Step 2.

5.5.1.2 AOI Screening Step 2 – Background Comparison

Sediment analyte results were compared against the background M2SD values presented in Appendix A, Volume 2, Attachment 5, where available. Background values are not available for organic constituents and other select inorganic and radionuclide constituents. Detection of these constituents above the detection limits indicates their presence in the environment. Laboratory qualifier codes were used to identify whether a constituent is detected.

In AOI Screening Step 2, sediment analytical results are compared with the corresponding background M2SD value. For those analytes where sample results are below or equal to the corresponding background M2SD, the analyte is eliminated as a potential AOI. Analytes that have at least one sample result above the background M2SD are carried forward to AOI Screening Step 3. Analytes that do not have a background M2SD proceed to AOI Screening Step 3.

5.5.1.3 AOI Screening Step 3 – PRG Comparison

AOI Screening Step 3 involves comparison of the sediment results with the WRW PRG. If a constituent's maximum result is less than or equal to the PRG, it is eliminated as an AOI. For constituents where the maximum result is greater than the PRG, it is retained as an AOI and carried forward to AOI Screening Step 4.

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5.5.1.4 AOI Screening Step 4 – Process Knowledge Evaluation

AOI Screening Step 4 involves the determination of whether an AOI should be retained or eliminated based on process knowledge or other criteria involving professional judgment. The process knowledge evaluation involves an assessment of contaminants that are not reasonably expected to be AOIs based on historical site process knowledge (K-H 2005) even though their concentrations or activities may equal or exceed the sediment WRW PRG. Process knowledge alone is not used to eliminate a constituent as an AOI. Other analyte criteria such as its areal distribution relative to RFETS activities, its proximity to contaminant sources, accelerated actions performed to remove a contaminant source, and its natural occurrence and distribution in the environment were also considered when evaluating whether to retain or eliminate a constituent as an AOI.

5.5.2 Results of Sediment AOI Screening

Based on the AOI screening process shown on Figure 5.24, Ten sediment AOIs were identified and retained, including two SVOCs (benzo(a)pyrene and dibenz(a,h)anthracene), five metals (antimony, arsenic, chromium, silver, and thallium), and three radionuclides (americium-241, plutonium-239/240, and uranium-238). The constituents highlighted in color in Table 5.8 identify those constituents that have a frequency of detection between greater than 0 percent and less than 1 percent (green), between 1 percent and 5 percent (yellow), and greater than 5 percent (orange)] above the WRW PRG. Table 5.9 lists the sediment AOIs by drainage basin.

The frequency of detection for the sediment AOIs above the WRW PRG ranges between greater than 0 percent and less than 1 percent (five constituents), 1 to less than 5 percent (three constituents), and greater than 5 percent (two constituents). The sediment constituents identified and retained as AOIs are listed in Table 5.8 along with summary statistics for each constituent. Figure 5.25 through Figure 5.34 show the nature and extent of sediment AOIs. Sediment analytes eliminated as AOIs based on process knowledge or professional judgment are listed in Table 5.7. The extent of other surface water constituents evaluated in the nature and extent that were not retained as AOIs are included on a CD ROM as Figures A2.1 through A2.184 in Attachment 2.

5.5.2.1 Polychlorinated Biphenyls (PCBs), Dioxins, and Furans

No PCBs, dioxins, or furans were identified as sediment AOIs. Table 5.6 summarizes PCBs and dioxins analyzed and reported in the data evaluated. The nature and extent of PCBs, dioxins, and furans that were not identified as sediment AOIs are listed in Table 5.6 and shown on the extent maps in Attachment 2 (Figures A2.1 through A2.11).

5.5.2.2 Pesticides, Herbicides, and Fungicides

No pesticides, herbicides, or fungicides were identified as sediment AOIs. Table 5.6 summarizes pesticides, herbicides, and fungicides analyzed and reported in the data evaluated. The nature and extent of pesticides, herbicides, and fungicides that were not identified as sediment AOIs are listed in Table 5.6 and shown on the extent maps in Attachment 2 (Figures A2.12 through A2.47).

5.5.2.3 Semivolatile Organic Compounds (SVOCs)

Benzo(a)pyrene and dibenz(a,h)anthracene were the only SVOCs retained as a sediment AOIs (Table 5.8). Figure 5.25 and Figure 5.26 show the extent of benzo(a)pyrene and dibenz(a,h)anthracene in sediments. Table 5.6 summarizes other SVOCs analyzed and reported in the data evaluated. SVOCs that were not identified as sediment AOIs are listed in Table 5.6 and shown on the extent maps in Attachment 2 (A2.48 through A2.96). Section 5.7.3.1 and Figure 5.25 through Figure 5.26 present further discussion of SVOC sediment AOIs.

5.5.2.4 Volatile Organic Compounds (VOCs)

No VOCs were identified as sediment AOIs. Table 5.6 summarizes VOCs analyzed and reported in the data evaluated. VOCs that were not identified as sediment AOIs are listed in Table 5.6 and shown on the extent maps in Attachment 2 (Figures A2.97 through A2.149).

5.5.2.5 Metals

Five metals (antimony, arsenic, chromium, silver, and thallium) were identified as sediment AOIs (Table 5.8). Table 5.6 summarizes other metals analyzed and reported in the data evaluated, but not retained as sediment AOIs. Metals that were not identified as sediment AOIs are shown on the extent maps in Attachment 2 (Figures A2.150 through A2.171). Section 5.7.3.2 and Figure 5.27 through Figure 5.31 present further discussion of the nature and extent of metal sediment AOIs.

5.5.2.6 Radionuclides

Three radionuclides (americium-241, plutonium-239/240, and uranium-238) were identified as sediment AOIs (Table 5.8). Table 5.6 summarizes the other radionuclides analyzed and reported in the data evaluated, but not retained as sediment AOIs. The nature and extent of radionuclides that were not identified as sediment AOIs are shown on the extent maps in Attachment 2 (Figures A2.172 through A2.179). Section 5.7.3.3 Figure 5.32 through Figure 5.34 present further discussion of the nature and extent of radionuclide sediment AOIs.

5.5.2.7 Water Quality Parameters

No water quality parameters were identified as sediment AOIs. Table 5.6 summarizes sediment water quality parameters analyzed and reported in the data evaluated. The nature and extent of sediment water quality parameters that were not identified as AOIs are listed in Table 5.6 and shown on the extent maps in Attachment 2 (Figures A2.180 through A2.184).

5.6 Nature and Extent of Surface Water Contamination

This section summarizes the nature and extent of surface water AOIs at RFETS. For each of the 19 AOIs in surface water, maps were created to show the relative concentration and extent of contamination at the site (Figure 5.5 through Figure 5.23).

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5.6.1 Surface Water AOI Extent Maps

For each surface water AOI extent map, the results are displayed as four categories, as listed below, to identify the predominant areas of contaminant extent:

- Locations where the AOI is not detected;
- Locations where the AOI is detected but is less than or equal to the surface water background M2SD;
- Locations where the AOI is greater than the background M2SD but less than or equal to the surface water standard (that is, lowest surface water standard or PQL, whichever is higher); and
- Locations where the AOI is greater than the surface water standard (that is, lowest surface water standard or PQL, whichever is higher).

5.6.2 Temporal Data

AOI sampling location symbol shapes are designed to show the 5-year time interval that the sample was collected. The time intervals identified on the surface water AOI extent figures are defined as:

- Sample collected since January 1, 2000.

5.6.3 Extent of AOIs in Surface Water

Each of the surface water AOIs are mapped on Figure 5.5 through Figure 5.23 and are discussed by analyte group below. Figure 5.1 and Figure 5.3 shows the location of surface water monitoring locations, drainage basins and site features discussed in the text.

5.6.3.1 Volatile Organic Compounds (VOCs)

Carbon tetrachloride, chloroform, cis-1,2-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride were the only VOCs identified as surface water AOIs (Table 5.4). Figure 5.5 through Figure 5.11 show the areal distribution of the surface water VOC AOIs.

Figure 5.5 shows the extent of carbon tetrachloride in surface water. The majority (89 percent) of the sample results are less than the surface water standard. The frequency of detection of carbon tetrachloride in surface water above the surface water standard is approximately 11 percent. Carbon tetrachloride occurrences above the surface water standard are primarily found at the footing drain outfalls from Buildings 771 and 774 and at SW061 on South Walnut Creek.

Figure 5.6 shows the extent of chloroform in surface water. The majority (97 percent) of the sample results are less than the surface water standard. The frequency of detection of chloroform in surface water above the surface water standard is approximately 3 percent. Chloroform occurrences above the surface water standard are primarily found at the

footing drain outfalls from Buildings 771 and 774 and at SW33503 on the unnamed drainage between Buildings 371 and 771.

Figure 5.7 shows the extent of cis-1,2-dichloroethene in surface water. The majority (99 percent) of the cis-1,2-dichloroethene results are less than the surface water standard. The frequency of detection of cis-1,2-dichloroethene in surface water above the surface water standard is approximately 1 percent. Cis-1,2 dichloroethene occurrences above the surface water standard are found at the SW056 outfall south of the 991 parking lot.

Figure 5.8 shows the extent of methylene chloride in surface water. The majority (96 percent) of the sample results are less than the background M2SD. The frequency of detection of methylene chloride in surface water above the surface water standard is approximately 4 percent. Methylene chloride occurrences above the surface water standard are primarily found at the footing drain outfall of Building 771, at the SW056 outfall south of the 991 parking lot, and at SW061 and SW132 on South Walnut Creek.

Figure 5.9 shows the extent of tetrachloroethene in surface water. The majority (94 percent) of the sample results are less than the surface water standard. The frequency of detection of tetrachloroethene in surface water above the surface water standard is approximately 6 percent. Tetrachloroethene occurrences above the surface water standard are primarily found at the Building 771 footing drain outfall, at the SW056 outfall south of the 991 parking lot, and at SW061 and SW132 on South Walnut Creek.

Figure 5.10 shows the extent of trichloroethene in surface water. The majority (95 percent) of the sample results are less than the surface water standard. The frequency of detection of trichloroethene in surface water above the surface water standard is approximately 5 percent. Trichloroethene occurrences above the surface water standard are primarily found at the SW056 outfall south of the 991 parking lot, at SW061 on South Walnut Creek, along South Walnut Creek at Ponds B-2 and B-4, and at a seep between Woman Creek and the SID at SW10300 southeast of the 903 Pad.

Figure 5.11 shows the extent of vinyl chloride in surface water. The majority (99 percent) of the sample results are less than the background M2SD. The frequency of detection of vinyl chloride in surface water above the surface water standard is approximately 1 percent. Vinyl chloride occurrences above the surface water standard are primarily found at the SW056 outfall south of the 991 parking lot and at Pond B-2 on South Walnut Creek.

5.6.3.2 Metals

Dissolved aluminum and total beryllium, chromium, lead, nickel, and zinc were the only metals identified as surface water AOIs (Table 5.4). Figure 5.12 through Figure 5.17 show the areal distribution of the metal AOIs.

Figure 5.12 shows the extent of dissolved aluminum in surface water. The majority (97 percent) of the sample results are less than the background M2SD. Note that the background M2SD for dissolved aluminum is above the surface water standard. The

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frequency of detection of dissolved aluminum in surface water above both the background M2SD and the surface water standard is approximately 3 percent. Dissolved aluminum occurrences above the surface water standard are primarily found at the footing drain outfall (SW085) of Building 779.

Figure 5.13 shows the extent of total beryllium in surface water. The majority (96 percent) of the sample results are less than the background M2SD. The frequency of detection of total beryllum in surface water above the surface water standard is approximately 1 percent. Total beryllium occurrences above the surface water standard are primarily found at GS06 on the Owl Branch segment of Woman Creek, GS38 on the Central Avenue Ditch just east of 8th Street, GS50 on a drainage ditch northeast of Building 990, and GS60 on a ditch northeast of Building 371/374 along the protected area patrol road.

Figure 5.14 shows the extent of total chromium in surface water. The majority (97 percent) of the sample results are less than the background M2SD. Note that the background M2SD for total chromium is above the surface water standard. The frequency of detection of total chromium in surface water above both the background M2SD and the surface water standard is approximately 3 percent. Total chromium occurrences above the surface water standard are primarily found at GS06 on the Owl Branch segment to Woman Creek, GS38 on the Central Avenue Ditch just east of 8th Street, GS49 on the west-northwest side of Building 776, GS50 on a drainage ditch northeast of Building 990, GS60 on a ditch northeast of Building 371/374 along the protected area patrol road, and SW018 on the North Walnut Creek tributary just south of the 771 trailers.

Figure 5.15 shows the extent of total lead in surface water. The majority (82 percent) of the sample results are less than the background M2SD. The frequency of detection of total lead in surface water above the surface water standard is approximately 5 percent. Total lead occurrences above the surface water standard are primarily found at GS01 at Woman Creek and Indiana Street, GS38 on the Central Avenue Ditch just east of 8th Street, GS49 on the west-northwest side of Building 776, GS50 on a drainage ditch northeast of Building 990, and GS60 on a ditch northeast of Building 371/374 along the protected area patrol road.

Figure 5.16 shows the extent of total nickel in surface water. The majority (94 percent) of the sample results are less than the background M2SD. The frequency of detection of total nickel in surface water above the surface water standard is approximately 1 percent. Total nickel occurrences above the surface water standard are primarily found at GS38 on the Central Avenue Ditch just east of 8th Street and GS60 on a ditch northeast of Building 371/374 along the protected area patrol road.

Figure 5.17 shows the extent of total zinc in surface water. The majority (87 percent) of the sample results are less than the background M2SD. The frequency of detection of total zinc in surface water above the surface water standard is approximately 2 percent. Total zinc occurrences above the surface water standard are primarily found at GS01 at

Woman Creek and Indiana Street, GS32 a storm drain from Building 779, GS38 on the Central Avenue Ditch just east of 8th Street, GS50 on a drainage ditch northeast of Building 990, and SW100100.

5.6.3.3 Radionuclides

Total americium-241, gross alpha, gross beta, plutonium-239/240, and uranium isotopes were the only radionuclides identified as surface water AOIs (Table 5.4). Figure 5.18 through Figure 5.22 show the areal distribution of the radionuclide AOIs.

Figure 5.18 shows the extent of total americium-241 in surface water. Most (60 percent) of the sample results are less than the background M2SD. The frequency of detection of total americium-241 in surface water above the surface water standard is approximately 17 percent. Total americium-241 occurrences above the surface water standard are primarily found within the IA and along Walnut and Woman Creeks downstream of the IA.

Figure 5.19 shows the extent of total gross alpha in surface water. The majority (91 percent) of the sample results are less than the background M2SD. Note that the background M2SD for total gross alpha is above the surface water standard. The frequency of detection of total gross alpha in surface water above both the background M2SD and the surface water standard is approximately 9 percent. Total gross alpha occurrences above the surface water standard are primarily found at SW20105 along the unnamed drainage between Buildings 371 and 771 and at CG49-031 in the Bowman's Pond area.

Figure 5.20 shows the extent of total gross beta in surface water. The majority (91 percent) of the sample results are less than the background M2SD. Note that the background M2SD for total gross beta is above the surface water standard. The frequency of detection of total gross beta in surface water above both the background M2SD and the surface water standard is approximately 9 percent. Total gross beta occurrences above the surface water standard are primarily found at SW20105 along the unnamed drainage between Buildings 371 and 771.

Figure 5.21 shows the extent of total plutonium-239/240 in surface water. Most (54 percent) of the sample results are less than the background M2SD. The frequency of detection of total plutonium-239/240 in surface water above the surface water standard is approximately 21 percent. Total plutonium-239/240 occurrences above the surface water standard are primarily found within the IA and along Walnut and Woman Creeks downstream of the IA.

Figure 5.22 shows the extent of total uranium isotopes in surface water. The majority (94 percent) of the sample results are less than the background M2SD. The frequency of detection of total uranium isotopes in surface water above the surface water standard is less than 4 percent. The only total uranium isotopes occurrence above the surface water standard is found along North Walnut Creek at Ponds A-1 and A-2, SW036 on the South

Interceptor Ditch south of Building 664 , and SW120 a drainage ditch north of the Solar Evaporation Ponds along the south side of the protected area patrol road.

5.6.3.4 Water Quality Parameters

Nitrate/nitrite (as N) was the only water quality parameter identified as surface water AOI (Table 5.4). Figure 5.23 show the areal distribution of nitrate/nitrite (as N) in surface water.

Figure 5.23 shows the extent of nitrate/nitrite (as N) in surface water. Most (58 percent) of the sample results are less than the background M2SD. The frequency of detection of nitrate/nitrite (as N) in surface water above the surface water standard is approximately 16 percent. Nitrate/nitrite (as N) occurrences above the surface water standard are primarily found at the outfall from the Building 774 footing drain, GS13 on North Walnut Creek, and Ponds A-2 and A-3 outfalls on North Walnut Creek.

5.6.4 Summary of Surface Water AOIs

Nineteen surface water AOIs were identified and retained for further evaluation (Table 5.4 and Figure 5.5 through Figure 5.23). These AOIs include seven VOCs (carbon tetrachloride, chloroform, cis-1,2-dichloroethene, methylene chloride, tetrachloroethene, trichloroethene, and vinyl chloride), six metals (dissolved aluminum and total beryllium, chromium, lead, nickel, and zinc), five radionuclides (total americium-241, gross alpha, gross beta, plutonium-239/240, and uranium isotopes), and one water quality parameter (nitrate/nitrite (as N). All of these AOIs are above their respective WRW PRGs. Table 5.5 lists the surface water AOIs by drainage basin. These AOIs will be further evaluated in Section 7.0.

5.7 Nature and Extent of Sediment Contamination

This section summarizes the nature and extent of sediment AOIs at RFETS. For each of the ten sediment AOIs (Table 5.8), maps were made to show the extent of contaminants in sediment at the site. Sediment data are shown as sediment AOI extent maps (Figure 5.25 through Figure 5.34).

5.7.1 Sediment AOI Extent Maps

For each sediment AOI extent map, results are displayed as five categories, as listed below, to identify the predominant areas of contaminant extent:

- Locations where the AOI is not detected.
- Locations where the AOI is detected but is less than or equal to the sediment background M2SD.
- Locations where the AOI is greater than the M2SD but is less than or equal to the WRW PRG (that is, a target 1 x 10^{-6} excess carcinogenic risk or a HQ of 0.1).

- Locations where the AOI is greater than the WRW PRG but is less than or equal to 10 times the WRW PRG, that is 1 x 10^{-5} excess carcinogenic risk or a HQ of 1.
- Locations where the AOI is greater than 10 times the WRW PRG.

5.7.2 Temporal Data

AOI sampling location symbol shapes are designed to show the 5-year time interval that the sample was collected. The time intervals identified on the AOI extent figures are defined as:

- Samples collected between June 28, 1991 and December 31, 1994;
- Samples collected between January 1, 1995 and December 31, 1999; and
- Samples collected since January 1, 2000.

5.7.3 Extent of AOIs in Sediment

Each of the sediment AOIs are mapped on Figure 5.25 through Figure 5.34 and are discussed by analyte group below. Figure 5.2 and Figure 5.3 shows the sediment sampling locations, surface water drainage basins, and site features discussed in the text.

5.7.3.1 Semivolatile Organic Compounds (SVOCs)

Benzo(a)pyrene and dibenz(a,h)anthracene were the only SVOCs identified as a sediment AOIs (Table 5.8). Figure 5.25 and Figure 5.26 shows the extent of benzo(a)pyrene and dibenz(a,h)anthracene in sediments.

Figure 5.25 shows the extent of benzo(a)pyrene in sediments. Benzo(a)pyrene concentrations in sediment are above the PRG (9.7 percent), but less than 10 times the PRG. Benzo(a)pyrene occurrences above the PRG are primarily found along South Walnut Creek at Pond B-4, the Bowman's Pond area, the Central Avenue Ditch adjacent to Tanks 221 and 224, the 750 Pad, the 904 Pad, the Central Avenue Ditch upstream of the North Perimeter Road, the North Perimeter Road west of Building 371, and a tributary to the SID that drains the Building 881 area.

Figure 5.26 shows the extent of dibenz(a,h)anthracene in sediments. Dibenz(a,h)anthracene concentrations in sediment are above the WRW PRG (0.4 percent), but less than 10 times the WRW PRG. The only occurrence of dibenz(a,h)anthracene above the WRW PRG is found in a single characterization sample (CR31-005) from 0 to 0.5 feet below grade at Pond C-1.

5.7.3.2 Metals

Antimony, arsenic, chromium, silver, and thallium were the only metals identified as sediment AOIs (Table 5.8). Figure 5.27 through Figure 5.31 show the areal distribution of the sediment metal AOIs.

100

Figure 5.27 shows the extent of antimony in sediments. The majority (95 percent) of the sample results are less than the background M2SD. The frequency of detection of antimony in sediment above the WRW PRG is approximately 0.3 percent. None of the antimony results exceed 10 times the WRW PRG. Only one occurrence of antimony in sediments above the PRG is found at the site. This occurrence is in a tributary ditch to the SID southwest of Building 664.

Figure 5.28 shows the extent of arsenic in sediments. The majority (75 percent) of the arsenic results are less than the background M2SD. Note that the arsenic background M2SD is greater than the WRW PRG. The frequency of arsenic concentrations in sediment above both the background M2SD and WRW PRG is approximately 25 percent. Only 0.3 percent of the arsenic sediment samples have a frequency of detection above 10 times the WRW PRG. Arsenic occurrences above the PRG are primarily found along North and South Walnut Creeks, the SID, 400 Area, Central Avenue Ditch, Pond C-2, No Name Gulch downstream of the Landfill Pond, Rock Creek, and at Ponds D-1 and D-2. Single occurrences are found on Owl Branch, a tributary to Woman Creek south of Owl Branch, and the Antelope Creek headwaters. The concentration in the sediment sample from the headwaters of Antelope Creek is greater than 10 times the WRW PRG.

Figure 5.29 shows the extent of chromium in sediments. The majority (90 percent) of the chromium results are less than the background M2SD. The frequency of detection of chromium in sediment above the WRW PRG is approximately 4 percent. None of the chromium samples exceed 10 times the WRW PRG. Chromium occurrences above the WRW PRG are primarily found along North Walnut Creek upstream of Pond A-1 and in Ponds A-2 and A-3, Pond B-4, Pond C-1, along the West Diversion Ditch, 400 Area, along the tributary ditch to the South Interceptor Ditch (SID) southwest of Building 664, and along the 750 Pad.

Figure 5.30 shows the extent of silver in sediments. The majority (94 percent) of the silver results are less than the background M2SD. The frequency of detection of silver in sediments above the WRW PRG is approximately 0.3 percent. None of the silver results exceed 10 times the WRW PRG. The only silver occurrence above the WRW PRG is found in a characterization sample (DB47-004) from 2.5 to 3.9 feet below grade at Pond B-4.

Figure 5.31 shows the extent of thallium in sediments. The majority (96 percent) of the sample results are less than the background M2SD. The frequency of detection of thallium in sediments above the WRW PRG is approximately 0.3 percent. The only thallium occurrence above the WRW PRG is found in a characterization sample (CR31-005) from 0 to 0.5 feet below grade at Pond C-1.

5.7.3.3 Radionuclides

Americium-241, plutonium-239/240, and uranium-238 were identified as sediment AOIs (Table 5.8). Figure 5.32 through Figure 5.34 show the areal distribution of the radionuclide AOIs.

Figure 5.32 shows the extent of total americium-241 in sediments. One-half (52 percent) of the americium-241 results are less than the background M2SD. The frequency of detection of americium-241 in sediment above the WRW PRG is approximately 1 percent. None of the americium-241 samples exceed 10 times the WRW PRG. The only occurrences of americium-241 above the WRW PRG are found in Pond B-4.

Figure 5.33 shows the extent of plutonium-239/240 in sediments. Most (64 percent) of the plutonium-239/240 results are less than the background M2SD. The frequency of detection of plutonium-239/240 in sediment above the WRW PRG is approximately 3 percent. Only 0.2 percent of the plutonium-239/240 results is above 10 times the WRW PRG. Plutonium-239/240 occurrences in sediment above the PRG are primarily found along North Walnut Creek at Ponds A-1 and A-2, South Walnut Creek at Pond B-4, and single occurrences along the SID south of the 903 Pad, a ditch southeast of the 903 Pad in the Lip Area, and the Central Avenue Ditch at the corner of 8th and Central Avenue.

Figure 5.34 shows the extent of uranium-238 in sediments. The majority (95 percent) of the uranium-238 results are less than the background M2SD. The frequency of detection of uranium-238 in sediment above the WRW PRG is approximately 0.2 percent. None of the uranium-238 samples exceed 10 times the WRW PRG. Only one occurrence of uranium-238 in sediments above the WRW PRG is found at the site. This occurrence is in a drainage ditch along the south side of Building 444.

5.7.4 Summary of Sediment AOIs

Ten sediment AOIs were identified and retained for further evaluation (Table 5.8 and Figure 5.25 through Figure 5.34). These AOIs include two SVOCs (benzo[a]pyrene and dibenz[a,h]anthracene), five metals (antimony, arsenic, chromium, silver, and thallium), and three radionuclides (americium-241, plutonium-239/240, and uranium-238). All of these AOIs are above their respective WRW PRGs. Only arsenic and plutonium-239/240 are above 10 times the WRW PRG. A summary of the sediment AOIs by drainage basin is provided in Table 5.9. These AOIs will be further evaluated in Section 7.0.

5.8 References

CDH, 1992, Project Tasks 3 & 4 Final Draft Report, Reconstruction of Historical Rocky Flats Operations & Identification of Release Points, prepared by ChemRisk, August 1992.

Colorado WQCD, 1993, Guidance On Data Requirements And Data Interpretation Methods Used In Stream Standards And Classification Proceedings, July.

Colorado WQCD, 2004, Guidance On Data Requirements And Data Interpretation Methods Used In Water Quality Standards And Classification Proceedings, August.

Colorado WQCD, 2005, Section 303(d) Listing Methodology, 2006 Listing Cycle, Joint Colorado WQCC and Colorado WQCD document (not dated - available on CDPHE website).

DOE, 1993, Background Geochemical Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

K-H, 2005, Review of Historical Knowledge Related to Metals and Selected Radionuclides Identified As Environmental Media Analytes of Interest, Rocky Flats Environmental Technology Site, Golden, Colorado, July 15.

USEPA, 1999, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, EPA-540-R-99-008, October.

USEPA, 2001, USEPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, Final, OSWER 9240.1-34, EPA-540-R-00-006, June.

USEPA, 2005, USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, Draft Final, OSWER 9240.1-46, EPA-540-R-04-009, January.

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
CG49-031	1	06/02/04	06/02/04	Surface Water
CO66-000	1	01/11/05	01/11/05	Surface Water
CX19-001	1	12/29/04	12/29/04	Surface Water
D1	1	04/22/92	04/22/92	Surface Water
DO13-001	1	01/10/05	01/10/05	Surface Water
DY05-001	1	01/10/05	01/10/05	Surface Water
FD-111-1	5	03/07/92	06/01/94	Surface Water
FD-371-2	1	06/11/95	06/11/95	Surface Water
FD-371COMP	1	03/07/92	03/07/92	Surface Water
FD-444-460	8	03/07/92	03/19/95	Surface Water
FD-774-1	12	07/25/92	04/23/03	Surface Water
FD-774-2	2	06/20/02	04/24/03	Surface Water
FD-774-4	5	05/30/01	04/23/03	Surface Water
FD-774-5	3	05/30/01	04/23/03	Surface Water
FD-991-1	5	04/26/93	06/01/94	Surface Water
GS01	201	03/24/92	06/10/05	Surface Water
GS01A	2	03/17/92	04/01/92	Surface Water
GS02	13	08/08/91	04/17/98	Surface Water
GS03	290	08/28/91	07/23/05	Surface Water
GS03T	1	11/05/02	11/05/02	Surface Water
GS04	33	03/31/92	04/13/05	Surface Water
GS05	36	07/23/91	06/10/04	Surface Water
GS06	27	08/08/91	05/23/02	Surface Water
GS07	6	07/24/91	10/17/93	Surface Water
GS08	117	04/28/97	07/14/05	Surface Water
GS09	8	06/03/92	11/08/94	Surface Water
GS10	303	07/23/91	07/28/05	Surface Water
GS11	102	05/28/92	07/14/05	Surface Water
GS12	2	09/24/92	09/29/94	Surface Water
GS13	371	06/28/91	06/15/05	Surface Water
GS14	1	10/17/93	10/17/93	Surface Water
GS15	1	10/26/92	10/26/92	Surface Water
GS16	3	10/17/93	10/17/94	Surface Water
GS17	3	10/17/93	12/14/01	Surface Water
GS1704	1	06/09/04	06/09/04	Surface Water
GS18	1	10/17/93	10/17/93	Surface Water
GS21	37	05/02/94	05/03/05	Surface Water
GS22	48	05/03/95	03/15/05	Surface Water
GS24	10	05/02/95	07/09/96	Surface Water
GS25	9	05/02/95	07/09/96	Surface Water
GS26	3	04/18/95	03/14/96	Surface Water
GS27	82	05/23/95	04/10/04	Surface Water
GS28	32	05/16/95	04/11/05	Surface Water
GS29	5	05/24/96	07/09/96	Surface Water
GS30	2	05/09/96	05/24/96	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
GS31	25	01/23/97	12/13/04	Surface Water
GS32	91	04/25/97	11/10/04	Surface Water
GS33	13	10/28/97	05/04/99	Surface Water
GS34	30	02/12/98	09/14/00	Surface Water
GS35	15	10/27/97	04/03/00	Surface Water
GS37	17	10/29/97	10/27/98	Surface Water
GS38	83	02/16/98	05/11/05	Surface Water
GS39	72	01/15/98	05/11/05	Surface Water
GS40	108	03/03/98	07/11/05	Surface Water
GS41	4	04/25/99	05/04/01	Surface Water
GS42	12	04/30/99	04/25/05	Surface Water
GS43	34	06/04/99	09/21/04	Surface Water
GS44	44	10/04/00	07/24/04	Surface Water
GS49	48	02/11/01	06/09/05	Surface Water
GS50	17	04/12/01	11/10/04	Surface Water
GS51	26	05/24/02	05/12/05	Surface Water
GS52	20	05/24/02	05/03/05	Surface Water
GS5204	1	06/09/04	06/09/04	Surface Water
GS53	6	03/17/03	04/12/05	Surface Water
GS54	7	03/25/03	04/30/05	Surface Water
GS55	47	04/10/02	04/27/05	Surface Water
GS56	22	03/17/03	05/18/05	Surface Water
GS57	55	04/05/02	05/30/05	Surface Water
GS58	7	03/19/02	05/23/02	Surface Water
GS59	30	11/19/02	05/31/05	Surface Water
GS60	26	08/30/03	06/10/05	Surface Water
GS61	20	10/30/03	04/12/05	Surface Water
GS61A	5	04/08/05	07/18/05	Surface Water
IHSS209	2	04/24/92	03/18/93	Surface Water
INT. DITCH	1	08/24/92	08/24/92	Surface Water
LANDFILL POND	10	07/15/91	05/24/95	Surface Water
SED00695	2	02/28/95	04/25/95	Surface Water
SED01595	1	04/25/95	04/25/95	Surface Water
SED02295	1	04/27/95	04/27/95	Surface Water
SED02695	2	02/21/95	04/25/95	Surface Water
SED02995	1	04/25/95	04/25/95	Surface Water
SED04195	2	03/17/95	04/25/95	Surface Water
SED04395	2	02/27/95	04/27/95	Surface Water
SED04595	2	02/23/95	04/28/95	Surface Water
SED04695	2	02/27/95	04/27/95	Surface Water
SED04795	1	04/27/95	04/27/95	Surface Water
SED05095	2	03/16/95	04/25/95	Surface Water
SED05395	2	02/21/95	05/02/95	Surface Water
SED05495	2	02/21/95	05/02/95	Surface Water
SED05995	1	04/28/95	04/28/95	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED06295	2	03/01/95	05/02/95	Surface Water
SED06595	2	02/22/95	04/28/95	Surface Water
SED06695	2	02/22/95	04/28/95	Surface Water
SED06895	2	03/01/95	05/02/95	Surface Water
SED07095	2	03/15/95	04/27/95	Surface Water
SED07195	2	03/15/95	04/27/95	Surface Water
SED07395	2	02/22/95	04/28/95	Surface Water
SED07495	2	02/22/95	04/28/95	Surface Water
SED07895	2	02/23/95	04/27/95	Surface Water
SED07995	2	03/01/95	05/02/95	Surface Water
SED08195	2	03/16/95	05/02/95	Surface Water
SED08295	2	03/16/95	04/25/95	Surface Water
SED08895	2	03/16/95	04/25/95	Surface Water
SED09095	2	03/17/95	04/25/95	Surface Water
SW001	1	03/17/92	03/17/92	Surface Water
SW00196	54	05/29/96	01/20/05	Surface Water
SW00198	1	02/17/98	02/17/98	Surface Water
SW002	3	11/07/91	04/01/92	Surface Water
SW00298	1	02/17/98	02/17/98	Surface Water
SW003	5	07/22/91	02/06/92	Surface Water
SW004	3	03/30/92	03/16/93	Surface Water
SW00495	1	10/26/00	10/26/00	Surface Water
SW005	10	07/01/91	03/23/05	Surface Water
SW006	9	07/01/91	02/25/93	Surface Water
SW007	7	03/05/92	05/05/95	Surface Water
SW009	1	03/16/92	03/16/92	Surface Water
SW014	1	03/30/92	03/30/92	Surface Water
SW017	5	07/29/91	02/26/92	Surface Water
SW018	36	07/15/91	07/14/05	Surface Water
SW01893	1	11/30/93	11/30/93	Surface Water
SW019	1	07/23/91	07/23/91	Surface Water
SW020	1	07/23/91	07/23/91	Surface Water
SW021	26	04/29/00	10/21/04	Surface Water
SW022	108	07/10/91	02/15/05	Surface Water
SW023	19	07/17/91	03/07/05	Surface Water
SW024	2	05/16/95	06/16/04	Surface Water
SW026	9	07/12/91	04/25/94	Surface Water
SW027	93	07/10/91	05/02/05	Surface Water
SW028	4	07/11/91	10/09/91	Surface Water
SW029	10	07/11/91	04/25/94	Surface Water
SW030	2	08/08/91	10/03/91	Surface Water
SW031	3	08/12/91	10/16/91	Surface Water
SW032	7	07/10/91	04/02/92	Surface Water
SW033	9	07/10/91	03/24/93	Surface Water
SW034	9	07/10/91	04/25/94	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SW035	11	07/10/91	09/26/95	Surface Water
SW036	27	08/13/91	02/21/05	Surface Water
SW03604	1	06/08/04	06/08/04	Surface Water
SW038	15	07/25/91	06/08/04	Surface Water
SW039	6	07/08/91	04/15/92	Surface Water
SW040	2	11/04/92	03/24/93	Surface Water
SW041	6	07/08/91	03/24/93	Surface Water
SW044	1	07/09/91	07/09/91	Surface Water
SW046	4	07/09/91	10/17/91	Surface Water
SW050	1	03/25/92	03/25/92	Surface Water
SW051	1	03/25/92	03/25/92	Surface Water
SW052	1	03/25/92	03/25/92	Surface Water
SW053	9	07/24/91	06/29/95	Surface Water
SW054	6	07/11/91	07/20/92	Surface Water
SW055	19	07/24/91	04/23/04	Surface Water
SW056	6	07/15/91	05/13/02	Surface Water
SW057	1	03/25/92	03/25/92	Surface Water
SW058	1	03/25/92	03/25/92	Surface Water
SW059	132	08/07/91	06/04/98	Surface Water
SW060	11	07/12/91	10/22/00	Surface Water
SW061	160	07/12/91	12/27/04	Surface Water
SW062	3	08/06/91	10/09/91	Surface Water
SW063	3	08/09/91	08/30/91	Surface Water
SW064	2	08/30/91	03/26/92	Surface Water
SW068	5	07/10/91	11/30/93	Surface Water
SW069	4	07/10/91	10/10/91	Surface Water
SW070	13	07/10/91	09/26/95	Surface Water
SW077	2	08/09/91	08/30/91	Surface Water
SW080	2	12/17/92	03/03/93	Surface Water
SW083	4	03/16/92	05/05/95	Surface Water
SW084	3	07/15/91	10/07/91	Surface Water
SW085	5	05/04/01	09/10/02	Surface Water
SW086	4	07/16/91	02/12/92	Surface Water
SW089	2	05/26/93	06/18/93	Surface Water
SW090	4	07/16/91	10/08/91	Surface Water
SW091	33	05/17/95	05/11/05	Surface Water
SW092	6	07/09/91	04/25/94	Surface Water
SW093	308	07/10/91	06/22/05	Surface Water
SW093T	12	01/27/03	05/10/03	Surface Water
SW097	11	07/29/91	10/30/02	Surface Water
SW098	20	07/23/91	11/10/97	Surface Water
SW099	10	07/02/91	04/02/03	Surface Water
SW100	4	03/02/92	04/02/03	Surface Water
SW100100	5	04/29/00	10/22/00	Surface Water
SW101	3	07/16/91	02/10/92	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SW10100	1	06/28/00	06/28/00	Surface Water
SW10195	1	06/30/95	06/30/95	Surface Water
SW10200	1	06/28/00	06/28/00	Surface Water
SW10295	1	07/03/95	07/03/95	Surface Water
SW10300	2	06/29/00	03/15/01	Surface Water
SW10395	1	06/30/95	06/30/95	Surface Water
SW104	1	06/15/92	06/15/92	Surface Water
SW10495	1	06/30/95	06/30/95	Surface Water
SW105	5	07/16/91	02/10/92	Surface Water
SW10595	1	06/28/95	06/28/95	Surface Water
SW106	1	09/09/91	09/09/91	Surface Water
SW10695	1	06/28/95	06/28/95	Surface Water
SW107	7	07/01/91	04/25/94	Surface Water
SW10795	1	07/03/95	07/03/95	Surface Water
SW108	5	07/01/91	03/16/93	Surface Water
SW10895	1	06/30/95	06/30/95	Surface Water
SW109	2	05/01/95	05/05/95	Surface Water
SW10995	1	06/30/95	06/30/95	Surface Water
SW11095	1	06/28/95	06/28/95	Surface Water
SW116	4	07/23/91	03/16/92	Surface Water
SW117	1	03/12/92	03/12/92	Surface Water
SW118	45	07/10/91	12/14/01	Surface Water
SW11804	2	06/14/04	12/03/04	Surface Water
SW118-P	2	08/24/92	08/26/92	Surface Water
SW118-S	2	08/24/92	08/26/92	Surface Water
SW119	25	04/11/01	10/13/04	Surface Water
SW120	43	03/22/00	02/23/05	Surface Water
SW122	5	07/15/91	02/10/92	Surface Water
SW127	7	08/01/91	04/25/94	Surface Water
SW128	5	07/24/91	03/16/92	Surface Water
SW129	4	07/22/91	10/23/91	Surface Water
SW130	6	08/01/91	03/01/93	Surface Water
SW131	5	07/08/91	12/17/92	Surface Water
SW132	169	07/22/91	12/27/04	Surface Water
SW134	36	03/23/92	07/14/04	Surface Water
SW135	2	03/23/92	02/25/93	Surface Water
SW136	2	03/19/92	03/22/93	Surface Water
SW137	2	03/19/92	03/22/93	Surface Water
SW20105	4	12/04/04	12/21/04	Surface Water
SW20205	1	12/03/04	12/03/04	Surface Water
SW20305	1	12/04/04	12/04/04	Surface Water
SW20405	1	12/04/04	12/04/04	Surface Water
SW20505	1	12/04/04	12/04/04	Surface Water
SW20605	1	12/04/04	12/04/04	Surface Water
SW20705	1	12/04/04	12/04/04	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SW20805	1	12/04/04	12/04/04	Surface Water
SW20905	1	12/04/04	12/04/04	Surface Water
SW21005	2	12/04/04	01/17/05	Surface Water
SW30195	1	05/17/95	05/17/95	Surface Water
SW30295	1	05/17/95	05/17/95	Surface Water
SW30395	1	05/17/95	05/17/95	Surface Water
SW30495	1	05/17/95	05/17/95	Surface Water
SW30595	1	05/17/95	05/17/95	Surface Water
SW30695	1	05/17/95	05/17/95	Surface Water
SW30795	1	05/17/95	05/17/95	Surface Water
SW30895	1	05/17/95	05/17/95	Surface Water
SW30995	1	05/17/95	05/17/95	Surface Water
SW31095	1	05/17/95	05/17/95	Surface Water
SW31195	1	05/17/95	05/17/95	Surface Water
SW31295	1	05/17/95	05/17/95	Surface Water
SW31395	1	05/17/95	05/17/95	Surface Water
SW31495	1	05/17/95	05/17/95	Surface Water
SW31595	1	05/17/95	05/17/95	Surface Water
SW31695	1	05/17/95	05/17/95	Surface Water
SW31795	1	05/24/95	05/24/95	Surface Water
SW31895	1	06/09/95	06/09/95	Surface Water
SW33195	1	06/09/95	06/09/95	Surface Water
SW33503	1	01/15/04	01/15/04	Surface Water
SW34495	1	06/29/95	06/29/95	Surface Water
SW500	1	10/05/92	10/05/92	Surface Water
SW501	3	11/04/92	04/25/94	Surface Water
SW50193	1	03/24/93	03/24/93	Surface Water
SW50293	1	03/24/93	03/24/93	Surface Water
SW506	3	11/04/92	04/25/94	Surface Water
SW50604	1	06/10/04	06/10/04	Surface Water
SW507	3	03/24/93	05/17/93	Surface Water
SW51104	1	06/09/04	06/09/04	Surface Water
SW55193	1	05/24/93	05/24/93	Surface Water
SW60092	1	09/16/92	09/16/92	Surface Water
SW60192	1	09/17/92	09/17/92	Surface Water
SW60292	1	09/16/92	09/16/92	Surface Water
SW60392	1	09/17/92	09/17/92	Surface Water
SW60492	1	09/17/92	09/17/92	Surface Water
SW60592	1	09/16/92	09/16/92	Surface Water
SW60692	1	09/16/92	09/16/92	Surface Water
SW60792	1	09/10/92	09/10/92	Surface Water
SW60892	1	09/16/92	09/16/92	Surface Water
SW60992	1	09/15/92	09/15/92	Surface Water
SW61092	1	09/10/92	09/10/92	Surface Water
SW61192	1	09/10/92	09/10/92	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SW61292	1	09/09/92	09/09/92	Surface Water
SW61392	1	09/09/92	09/09/92	Surface Water
SW61492	1	09/10/92	09/10/92	Surface Water
SW61592	1	09/02/92	09/02/92	Surface Water
SW61692	1	09/02/92	09/02/92	Surface Water
SW61792	1	09/03/92	09/03/92	Surface Water
SW61892	1	09/03/92	09/03/92	Surface Water
SW61992	1	09/03/92	09/03/92	Surface Water
SW62092	1	09/21/92	09/21/92	Surface Water
SW62192	1	09/21/92	09/21/92	Surface Water
SW62292	1	09/21/92	09/21/92	Surface Water
SW62392	1	09/23/92	09/23/92	Surface Water
SW62492	1	09/21/92	09/21/92	Surface Water
SW62592	1	09/23/92	09/23/92	Surface Water
SW62692	1	09/24/92	09/24/92	Surface Water
SW62792	1	09/23/92	09/23/92	Surface Water
SW62892	1	09/23/92	09/23/92	Surface Water
SW62992	1	09/24/92	09/24/92	Surface Water
SW63092	1	10/05/92	10/05/92	Surface Water
SW63192	1	10/05/92	10/05/92	Surface Water
SW63292	1	10/05/92	10/05/92	Surface Water
SW63392	1	10/05/92	10/05/92	Surface Water
SW63492	1	10/05/92	10/05/92	Surface Water
SW63592	1	10/01/92	10/01/92	Surface Water
SW63692	1	10/01/92	10/01/92	Surface Water
SW63792	1	10/01/92	10/01/92	Surface Water
SW63892	1	10/01/92	10/01/92	Surface Water
SW63992	1	10/01/92	10/01/92	Surface Water
SW64092	1	09/28/92	09/28/92	Surface Water
SW64192	1	09/28/92	09/28/92	Surface Water
SW64292	1	09/24/92	09/24/92	Surface Water
SW64392	1	09/28/92	09/28/92	Surface Water
SW64492	2	09/28/92	09/16/03	Surface Water
SW64592	1	09/02/92	09/02/92	Surface Water
SW64692	1	09/02/92	09/02/92	Surface Water
SW64792	1	09/01/92	09/01/92	Surface Water
SW64892	1	09/02/92	09/02/92	Surface Water
SW64992	1	09/01/92	09/01/92	Surface Water
SW67093	1	04/05/93	04/05/93	Surface Water
SW67193	1	04/05/93	04/05/93	Surface Water
SW67393	1	04/05/93	04/05/93	Surface Water
SW67493	1	04/05/93	04/05/93	Surface Water
SW67593	1	04/06/93	04/06/93	Surface Water
SW67693	1	04/06/93	04/06/93	Surface Water
SW67893	1	04/06/93	04/06/93	Surface Water

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SW67993	1	04/06/93	04/06/93	Surface Water
SW68093	1	04/07/93	04/07/93	Surface Water
SW68193	1	04/06/93	04/06/93	Surface Water
SW68293	1	04/06/93	04/06/93	Surface Water
SW68593	1	05/17/93	05/17/93	Surface Water
SW68693	1	05/17/93	05/17/93	Surface Water
SW68793	1	05/17/93	05/17/93	Surface Water
SW68893	1	05/17/93	05/17/93	Surface Water
SW68993	1	05/17/93	05/17/93	Surface Water
SW69093	1	05/17/93	05/17/93	Surface Water
SW69293	1	05/17/93	05/17/93	Surface Water
SW998	19	08/24/92	07/09/96	Surface Water
SWA104	1	06/14/04	06/14/04	Surface Water
SWA204	1	06/14/04	06/14/04	Surface Water
SWA3	1	12/11/91	12/11/91	Surface Water
SWA304	1	06/14/04	06/14/04	Surface Water
SWA4	1	12/17/91	12/17/91	Surface Water
SWA404	1	06/14/04	06/14/04	Surface Water
SWB1	1	12/11/91	12/11/91	Surface Water
SWB104	1	06/16/04	06/16/04	Surface Water
SWB2	2	12/11/91	09/23/02	Surface Water
SWB204	1	06/16/04	06/16/04	Surface Water
SWB3	1	12/16/91	12/16/91	Surface Water
SWB304	1	06/16/04	06/16/04	Surface Water
SWB3B4	1	06/16/04	06/16/04	Surface Water
SWB4	2	12/16/91	09/16/03	Surface Water
SWB403	1	09/16/03	09/16/03	Surface Water
SWB404	1	06/16/04	06/16/04	Surface Water
SWB5	1	09/16/03	09/16/03	Surface Water
SWB504	1	06/15/04	06/15/04	Surface Water
SWC104	1	06/09/04	06/09/04	Surface Water
SWC2	1	12/12/91	12/12/91	Surface Water
SWC204	1	06/08/04	06/08/04	Surface Water
SWLF04	1	06/16/04	06/16/04	Surface Water
SWMP04	1	06/16/04	06/16/04	Surface Water
SWNWC04	1	06/09/04	06/09/04	Surface Water
SWWC104	1	06/09/04	06/09/04	Surface Water
SWWC204	1	06/09/04	06/09/04	Surface Water
W+I	868	06/28/91	10/05/04	Surface Water
WC-CULVERT	1	02/16/98	02/16/98	Surface Water
090100	1	12/27/99	12/27/99	Sediment
090200	1	12/27/99	12/27/99	Sediment
090300	1	12/27/99	12/27/99	Sediment
10199	1	04/20/99	04/20/99	Sediment
10299	1	04/21/99	04/21/99	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
10399	1	04/21/99	04/21/99	Sediment
11199	2	04/20/99	04/28/99	Sediment
124POND	1	05/13/94	05/13/94	Sediment
13090299	1	06/17/99	06/17/99	Sediment
15197	1	08/21/97	08/21/97	Sediment
15297	1	08/21/97	08/21/97	Sediment
15397	1	08/21/97	08/21/97	Sediment
15497	1	08/21/97	08/21/97	Sediment
15597	1	08/21/97	08/21/97	Sediment
15697	1	08/21/97	08/21/97	Sediment
15797	1	08/21/97	08/21/97	Sediment
15897	1	08/21/97	08/21/97	Sediment
15997	1	08/21/97	08/21/97	Sediment
16097	1	08/21/97	08/21/97	Sediment
16197	1	08/21/97	08/21/97	Sediment
16297	1	08/21/97	08/21/97	Sediment
16397	1	08/21/97	08/21/97	Sediment
16497	1	08/21/97	08/21/97	Sediment
16597	1	08/21/97	08/21/97	Sediment
16697	1	08/21/97	08/21/97	Sediment
16797	1	08/21/97	08/21/97	Sediment
16897	1	08/21/97	08/21/97	Sediment
16997	1	08/21/97	08/21/97	Sediment
A4	1	05/04/92	05/04/92	Sediment
B123 METAL MANHOLE	1	03/11/02	03/11/02	Sediment
B5	1	05/04/92	05/04/92	Sediment
B5 OUTLET (N)	1	10/13/97	10/13/97	Sediment
B5 OUTLET (S)	1	10/13/97	10/13/97	Sediment
BD08-000	1	12/29/04	12/29/04	Sediment
BM69-000	1	12/30/04	12/30/04	Sediment
BQ49-000	1	12/29/04	12/29/04	Sediment
BU70-000	1	12/30/04	12/30/04	Sediment
BW35-067	1	07/20/05	07/20/05	Sediment
BZ35-003-01	1	06/26/03	06/26/03	Sediment
C1	1	05/05/92	05/05/92	Sediment
C2	1	05/04/92	05/04/92	Sediment
CC16-000	1	12/29/04	12/29/04	Sediment
CD78-000	1	12/30/04	12/30/04	Sediment
CG49-018	1	05/24/04	05/24/04	Sediment
CG49-021	1	05/24/04	05/24/04	Sediment
CG57-000	1	01/04/05	01/04/05	Sediment
CH49-017	1	05/25/04	05/25/04	Sediment
CH49-018	1	05/25/04	05/25/04	Sediment
CH49-019	1	05/25/04	05/25/04	Sediment
CH49-025	1	06/02/04	06/02/04	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
CH57-000	1	01/04/05	01/04/05	Sediment
CI38-022	1	05/29/02	05/29/02	Sediment
CI48-000	1	08/23/02	08/23/02	Sediment
CI57-000	1	01/04/05	01/04/05	Sediment
CI57-001	1	01/04/05	01/04/05	Sediment
CI58-000	1	01/04/05	01/04/05	Sediment
CI58-001	1	01/04/05	01/04/05	Sediment
CI58-002	1	01/04/05	01/04/05	Sediment
CI58-003	1	01/04/05	01/04/05	Sediment
CJ41-004	1	09/16/04	09/16/04	Sediment
CJ42-006	1	09/16/04	09/16/04	Sediment
CJ42-007	1	09/16/04	09/16/04	Sediment
CJ42-008	1	09/16/04	09/16/04	Sediment
CJ43-009	1	09/16/04	09/16/04	Sediment
CJ43-010	1	09/16/04	09/16/04	Sediment
CJ43-011	1	09/28/04	09/28/04	Sediment
CJ58-000	1	01/04/05	01/04/05	Sediment
CJ58-001	1	01/04/05	01/04/05	Sediment
CM37-031	1	02/06/03	02/06/03	Sediment
CM37-032	1	02/06/03	02/06/03	Sediment
CN37-012	1	02/10/03	02/10/03	Sediment
CN38-016	1	02/06/03	02/06/03	Sediment
CN38-017	1	02/06/03	02/06/03	Sediment
CN66-000	1	12/29/04	12/29/04	Sediment
CP46-000	1	11/12/02	11/12/02	Sediment
CR31-004	1	01/04/05	01/04/05	Sediment
CR31-005	1	07/19/05	07/19/05	Sediment
CR31-006	1	07/19/05	07/19/05	Sediment
CR31-007	1	07/19/05	07/19/05	Sediment
CR31-008	1	07/20/05	07/20/05	Sediment
CR32-001	1	09/26/02	09/26/02	Sediment
CR53-000	1	07/07/05	07/07/05	Sediment
CS53-000	1	12/21/04	12/21/04	Sediment
CS53-001	1	07/07/05	07/07/05	Sediment
CS53-002	1	07/07/05	07/07/05	Sediment
CS53-003	1	07/07/05	07/07/05	Sediment
CV54-000	1	07/19/05	07/19/05	Sediment
CW53-000	1	07/18/05	07/18/05	Sediment
CW54-000	1	12/22/04	12/22/04	Sediment
CW54-002	1	07/18/05	07/18/05	Sediment
CX19-000	1	12/29/04	12/29/04	Sediment
CX32-002	1	08/19/04	08/19/04	Sediment
DA54-000	1	07/29/05	07/29/05	Sediment
DA55-001	1	07/29/05	07/29/05	Sediment
DB47-000	1	07/14/05	07/14/05	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
DB47-001	1	07/15/05	07/15/05	Sediment
DB47-002	1	07/18/05	07/18/05	Sediment
DB47-003	1	07/14/05	07/14/05	Sediment
DB47-004	1	07/14/05	07/14/05	Sediment
DB47-005	1	07/15/05	07/15/05	Sediment
DB47-006	1	08/22/05	08/22/05	Sediment
DB55-000	1	07/28/05	07/28/05	Sediment
DC45-000	1	04/16/02	04/16/02	Sediment
DC55-000	1	07/29/05	07/29/05	Sediment
DD31-000	1	07/12/05	07/12/05	Sediment
DE30-000	1	07/12/05	07/12/05	Sediment
DE31-000	1	07/12/05	07/12/05	Sediment
DF29-000	1	07/12/05	07/12/05	Sediment
DF30-000	1	07/12/05	07/12/05	Sediment
DF51-000	1	07/27/05	07/27/05	Sediment
DF57-000	1	07/21/05	07/21/05	Sediment
DG52-000	1	07/27/05	07/27/05	Sediment
DG52-001	1	07/27/05	07/27/05	Sediment
DG57-000	1	07/21/05	07/21/05	Sediment
DG58-000	1	07/21/05	07/21/05	Sediment
DH52-000	1	07/27/05	07/27/05	Sediment
DH53-000	1	07/26/05	07/26/05	Sediment
DI57-000	1	07/21/05	07/21/05	Sediment
DI58-000	1	07/21/05	07/21/05	Sediment
DO13-000	1	01/10/05	01/10/05	Sediment
DY05-000	1	01/10/05	01/10/05	Sediment
EB61-000	1	07/13/05	07/13/05	Sediment
EC61-000	1	07/13/05	07/13/05	Sediment
EC61-001	1	07/13/05	07/13/05	Sediment
SED00001	1	05/07/97	05/07/97	Sediment
SED001	2	11/12/91	04/01/92	Sediment
SED0010101	1	01/23/01	01/23/01	Sediment
SED0010400	1	06/20/00	06/20/00	Sediment
SED001900	1	09/26/00	09/26/00	Sediment
SED002	4	09/03/91	04/01/92	Sediment
SED0020101	1	01/23/01	01/23/01	Sediment
SED0020400	1	06/20/00	06/20/00	Sediment
SED002900	1	09/26/00	09/26/00	Sediment
SED0030101	1	01/23/01	01/23/01	Sediment
SED0030400	1	06/20/00	06/20/00	Sediment
SED003900	1	09/26/00	09/26/00	Sediment
SED004	6	08/05/91	03/01/93	Sediment
SED0040101	1	01/23/01	01/23/01	Sediment
SED0040400	1	06/20/00	06/20/00	Sediment
SED004900	1	09/26/00	09/26/00	Sediment

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Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED0050101	1	01/23/01	01/23/01	Sediment
SED0050400	1	06/20/00	06/20/00	Sediment
SED005900	1	09/26/00	09/26/00	Sediment
SED006	3	08/26/91	03/04/92	Sediment
SED0060101	1	01/23/01	01/23/01	Sediment
SED0060400	1	06/20/00	06/20/00	Sediment
SED0070101	1	01/23/01	01/23/01	Sediment
SED0070400	1	06/20/00	06/20/00	Sediment
SED00795	1	02/14/95	02/14/95	Sediment
SED008	4	08/27/91	03/04/92	Sediment
SED0080400	1	06/20/00	06/20/00	Sediment
SED009	3	08/27/91	02/26/92	Sediment
SED0090400	1	06/20/00	06/20/00	Sediment
SED0100400	1	06/20/00	06/20/00	Sediment
SED01095	1	02/14/95	02/14/95	Sediment
SED011	6	09/03/91	06/20/00	Sediment
SED0110400	1	06/20/00	06/20/00	Sediment
SED01195	1	02/14/95	02/14/95	Sediment
SED0120400	1	06/20/00	06/20/00	Sediment
SED01295	1	02/14/95	02/14/95	Sediment
SED0130400	1	06/20/00	06/20/00	Sediment
SED0140400	1	06/20/00	06/20/00	Sediment
SED0150400	1	06/20/00	06/20/00	Sediment
SED016	6	08/14/91	03/18/93	Sediment
SED017	2	08/05/91	11/05/92	Sediment
SED018	2	11/18/91	03/03/93	Sediment
SED019	1	11/18/91	11/18/91	Sediment
SED020	6	08/05/91	03/18/93	Sediment
SED021	4	08/26/91	03/16/93	Sediment
SED022	2	08/26/91	12/09/91	Sediment
SED0220400	1	06/20/00	06/20/00	Sediment
SED023	4	08/05/91	03/31/93	Sediment
SED0230400	1	06/20/00	06/20/00	Sediment
SED024	4	09/03/91	11/05/92	Sediment
SED02495	1	03/10/95	03/10/95	Sediment
SED025	2	08/12/91	11/05/92	Sediment
SED0250400	1	06/20/00	06/20/00	Sediment
SED02595	1	03/10/95	03/10/95	Sediment
SED026	1	08/21/91	08/21/91	Sediment
SED02695	1	02/21/95	02/21/95	Sediment
SED027	5	08/28/91	11/05/92	Sediment
SED0270400	1	06/20/00	06/20/00	Sediment
SED02795	1	03/10/95	03/10/95	Sediment
SED028	1	08/28/91	08/28/91	Sediment
SED029	4	09/04/91	07/20/92	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED030	1	08/21/91	08/21/91	Sediment
SED031	1	08/21/91	08/21/91	Sediment
SED0320400	1	06/20/00	06/20/00	Sediment
SED03295	1	02/15/95	02/15/95	Sediment
SED0330400	1	06/20/00	06/20/00	Sediment
SED034	1	08/27/91	08/27/91	Sediment
SED0340400	1	06/20/00	06/20/00	Sediment
SED03495	1	03/14/95	03/14/95	Sediment
SED0350400	1	06/20/00	06/20/00	Sediment
SED036	1	08/26/91	08/26/91	Sediment
SED03695	1	03/02/95	03/02/95	Sediment
SED037	2	11/06/91	04/08/92	Sediment
SED038	1	11/05/91	11/05/91	Sediment
SED039	3	11/05/91	07/20/92	Sediment
SED0390400	1	06/20/00	06/20/00	Sediment
SED040	1	02/24/92	02/24/92	Sediment
SED041	1	02/24/92	02/24/92	Sediment
SED0410400	1	06/20/00	06/20/00	Sediment
SED0430400	1	06/20/00	06/20/00	Sediment
SED04395	1	02/27/95	02/27/95	Sediment
SED04492	1	06/05/92	06/05/92	Sediment
SED04495	1	02/27/95	02/27/95	Sediment
SED04795	1	03/15/95	03/15/95	Sediment
SED04895	1	03/03/95	03/03/95	Sediment
SED05095	1	03/16/95	03/16/95	Sediment
SED05195	1	03/16/95	03/16/95	Sediment
SED05295	1	03/16/95	03/16/95	Sediment
SED05395	1	02/21/95	02/21/95	Sediment
SED05795	1	02/15/95	02/15/95	Sediment
SED06095	1	02/24/95	02/24/95	Sediment
SED06195	1	02/24/95	02/24/95	Sediment
SED06295	1	03/01/95	03/01/95	Sediment
SED06695	1	02/22/95	02/22/95	Sediment
SED06895	1	03/01/95	03/01/95	Sediment
SED06995	1	03/03/95	03/03/95	Sediment
SED07095	1	03/15/95	03/15/95	Sediment
SED07295	1	03/15/95	03/15/95	Sediment
SED07495	1	02/22/95	02/22/95	Sediment
SED07595	1	03/03/95	03/03/95	Sediment
SED07695	1	03/03/95	03/03/95	Sediment
SED07995	1	03/01/95	03/01/95	Sediment
SED08195	1	03/16/95	03/16/95	Sediment
SED08295	1	03/16/95	03/16/95	Sediment
SED08395	1	02/20/95	02/20/95	Sediment
SED08495	1	02/20/95	02/20/95	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED08895	1	03/16/95	03/16/95	Sediment
SED09195	1	03/15/95	03/15/95	Sediment
SED09295	1	03/02/95	03/02/95	Sediment
SED09395	1	03/02/95	03/02/95	Sediment
SED09495	1	03/02/95	03/02/95	Sediment
SED09595	1	03/02/95	03/02/95	Sediment
SED10101	1	02/07/01	02/07/01	Sediment
SED11004	1	09/16/04	09/16/04	Sediment
SED116	1	09/04/91	09/04/91	Sediment
SED117	3	08/13/91	02/27/92	Sediment
SED118	4	08/13/91	11/18/04	Sediment
SED120	1	08/20/91	08/20/91	Sediment
SED125	1	08/14/91	08/14/91	Sediment
SED126	1	08/28/91	08/28/91	Sediment
SED127	2	12/08/92	03/18/93	Sediment
SED20104	1	11/18/04	11/18/04	Sediment
SED20193	1	05/31/94	05/31/94	Sediment
SED20204	1	11/18/04	11/18/04	Sediment
SED20293	1	05/31/94	05/31/94	Sediment
SED20304	1	11/18/04	11/18/04	Sediment
SED20393	1	05/19/94	05/19/94	Sediment
SED20493	1	04/06/94	04/06/94	Sediment
SED20593	1	04/06/94	04/06/94	Sediment
SED20693	1	04/06/94	04/06/94	Sediment
SED20793	1	04/07/94	04/07/94	Sediment
SED20893	1	03/21/94	03/21/94	Sediment
SED20993	1	03/21/94	03/21/94	Sediment
SED21093	1	03/21/94	03/21/94	Sediment
SED21193	1	03/21/94	03/21/94	Sediment
SED21293	1	04/11/94	04/11/94	Sediment
SED21393	1	04/11/94	04/11/94	Sediment
SED21493	1	04/05/94	04/05/94	Sediment
SED21593	1	04/05/94	04/05/94	Sediment
SED21693	1	04/05/94	04/05/94	Sediment
SED40100	1	10/03/00	10/03/00	Sediment
SED40196	1	02/13/96	02/13/96	Sediment
SED40200	1	10/03/00	10/03/00	Sediment
SED40296	1	02/13/96	02/13/96	Sediment
SED40300	1	10/03/00	10/03/00	Sediment
SED40396	1	02/13/96	02/13/96	Sediment
SED40500	1	10/03/00	10/03/00	Sediment
SED40600	1	10/03/00	10/03/00	Sediment
SED40700	1	10/03/00	10/03/00	Sediment
SED40800	1	10/04/00	10/04/00	Sediment
SED40900	1	10/04/00	10/04/00	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED41000	1	10/03/00	10/03/00	Sediment
SED41100	1	10/04/00	10/04/00	Sediment
SED41200	1	10/04/00	10/04/00	Sediment
SED41300	1	10/04/00	10/04/00	Sediment
SED41400	1	10/04/00	10/04/00	Sediment
SED41500	1	10/04/00	10/04/00	Sediment
SED41600	1	10/04/00	10/04/00	Sediment
SED41700	1	10/03/00	10/03/00	Sediment
SED41800	1	10/03/00	10/03/00	Sediment
SED41900	1	10/03/00	10/03/00	Sediment
SED42000	1	10/03/00	10/03/00	Sediment
SED42100	1	10/04/00	10/04/00	Sediment
SED42200	1	10/04/00	10/04/00	Sediment
SED42300	1	10/04/00	10/04/00	Sediment
SED42400	1	10/04/00	10/04/00	Sediment
SED42500	1	10/10/00	10/10/00	Sediment
SED42600	1	10/10/00	10/10/00	Sediment
SED42700	1	10/10/00	10/10/00	Sediment
SED42800	1	10/11/00	10/11/00	Sediment
SED42900	1	10/11/00	10/11/00	Sediment
SED43000	1	10/11/00	10/11/00	Sediment
SED43100	1	10/10/00	10/10/00	Sediment
SED43200	1	10/10/00	10/10/00	Sediment
SED43300	1	10/10/00	10/10/00	Sediment
SED43400	1	10/03/00	10/03/00	Sediment
SED43500	1	10/03/00	10/03/00	Sediment
SED501	1	11/05/92	11/05/92	Sediment
SED506	1	11/05/92	11/05/92	Sediment
SED507	1	11/05/92	11/05/92	Sediment
SED508	1	11/09/92	11/09/92	Sediment
SED509	1	11/09/92	11/09/92	Sediment
SED510	1	11/09/92	11/09/92	Sediment
SED511	1	11/10/92	11/10/92	Sediment
SED512	1	11/10/92	11/10/92	Sediment
SED513	1	11/10/92	11/10/92	Sediment
SED51593	1	07/08/93	07/08/93	Sediment
SED51693	1	07/08/93	07/08/93	Sediment
SED51793	1	07/08/93	07/08/93	Sediment
SED51893	1	07/08/93	07/08/93	Sediment
SED60092	2	10/29/92	06/06/94	Sediment
SED60192	2	11/02/92	06/06/94	Sediment
SED60292	2	10/29/92	06/06/94	Sediment
SED60392	2	10/29/92	06/06/94	Sediment
SED60492	2	11/02/92	06/06/94	Sediment
SED60592	2	11/12/92	06/01/94	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED60692	2	11/12/92	06/01/94	Sediment
SED60792	2	11/12/92	06/01/94	Sediment
SED60892	2	11/12/92	06/01/94	Sediment
SED60992	2	11/12/92	06/01/94	Sediment
SED61092	2	10/21/92	06/21/94	Sediment
SED61192	2	10/21/92	06/21/94	Sediment
SED61292	2	10/22/92	06/21/94	Sediment
SED61392	2	10/21/92	06/21/94	Sediment
SED61492	2	10/22/92	06/21/94	Sediment
SED61592	2	10/14/92	07/05/94	Sediment
SED61692	2	10/15/92	07/05/94	Sediment
SED61792	2	10/15/92	07/06/94	Sediment
SED61892	2	10/19/92	07/05/94	Sediment
SED61992	2	10/15/92	07/06/94	Sediment
SED63592	2	10/22/92	06/08/94	Sediment
SED63692	2	10/26/92	06/08/94	Sediment
SED63792	2	10/26/92	06/08/94	Sediment
SED63892	2	10/22/92	06/08/94	Sediment
SED63992	2	10/26/92	06/08/94	Sediment
SED64092	2	10/19/92	06/10/94	Sediment
SED64192	2	10/19/92	06/15/94	Sediment
SED64292	2	10/20/92	06/15/94	Sediment
SED64392	2	10/20/92	06/15/94	Sediment
SED64492	2	10/20/92	06/10/94	Sediment
SED64592	1	11/19/92	11/19/92	Sediment
SED64692	1	11/19/92	11/19/92	Sediment
SED64792	1	11/19/92	11/19/92	Sediment
SED64892	1	11/19/92	11/19/92	Sediment
SED64992	1	11/19/92	11/19/92	Sediment
SED65092	1	02/11/93	02/11/93	Sediment
SED65192	1	02/11/93	02/11/93	Sediment
SED65292	1	02/11/93	02/11/93	Sediment
SED65392	1	02/11/93	02/11/93	Sediment
SED65492	1	02/11/93	02/11/93	Sediment
SED65592	1	02/11/93	02/11/93	Sediment
SED65692	1	02/11/93	02/11/93	Sediment
SED65792	1	02/11/93	02/11/93	Sediment
SED65992	1	02/17/93	02/17/93	Sediment
SED66492	1	02/18/93	02/18/93	Sediment
SED66592	1	02/18/93	02/18/93	Sediment
SED66692	1	02/18/93	02/18/93	Sediment
SED66792	1	02/18/93	02/18/93	Sediment
SED68192	1	02/19/93	02/19/93	Sediment
SED68492	1	05/06/93	05/06/93	Sediment
SED68592	1	05/06/93	05/06/93	Sediment

Table 5.1
Summary of Surface Water and Sediment
Monitoring Locations and Sampling Frequencies

Station/Location	Number of Samples	Sampling Period		Media
SED68692	1	05/06/93	05/06/93	Sediment
SED68792	1	05/06/93	05/06/93	Sediment
SED68892	1	05/06/93	05/06/93	Sediment
SED68992	1	05/07/93	05/07/93	Sediment
SED69292	1	05/07/93	05/07/93	Sediment
SED69392	1	05/10/93	05/10/93	Sediment
SED69492	1	05/10/93	05/10/93	Sediment
SED69692	1	05/10/93	05/10/93	Sediment
SED69792	1	05/10/93	05/10/93	Sediment
SED69892	1	05/10/93	05/10/93	Sediment
SED69992	1	05/10/93	05/10/93	Sediment
SED70092	1	05/10/93	05/10/93	Sediment
SED750101	1	01/25/01	01/25/01	Sediment
SED750201	1	01/25/01	01/25/01	Sediment
SED750301	1	01/25/01	01/25/01	Sediment
SED750401	1	01/25/01	01/25/01	Sediment
SED750501	1	01/25/01	01/25/01	Sediment
SED80093	1	12/12/94	12/12/94	Sediment
SED80193	1	12/12/94	12/12/94	Sediment
SED80393	1	12/13/94	12/13/94	Sediment
SED80693	1	12/13/94	12/13/94	Sediment
SS120194	1	10/11/94	10/11/94	Sediment
SS204293	1	03/25/93	03/25/93	Sediment
SS224293	1	03/07/94	03/07/94	Sediment
SS305493	1	06/20/94	06/20/94	Sediment
SS30599	1	12/14/98	12/14/98	Sediment
SS306693	1	06/29/94	06/29/94	Sediment
SS441494	1	09/07/94	09/07/94	Sediment
SS460394	1	10/10/94	10/10/94	Sediment
SS614792	1	10/06/92	10/06/92	Sediment
SS711193	2	12/11/92	04/08/93	Sediment
SS711593	1	12/18/92	12/18/92	Sediment
SS9040400	1	02/28/00	02/28/00	Sediment
SW01793	1	11/29/93	11/29/93	Sediment
SW022	1	06/21/94	06/21/94	Sediment
SW030	1	11/29/93	11/29/93	Sediment
SW036	1	11/29/93	11/29/93	Sediment

Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	Is Constituent an AOI ?
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	
HERB	4-Nitrophenol	T	100-02-7	32	0	0.00	84	U	ug/L	Yes	----	----	----	----	56	0	0.00	----	No	----	No
MET	Arsenic	D		74	18	24.32	4.1	B	ug/L	Yes	11.890284	0	0	No	5	0	0.00	No	No	----	No
MET	Boron	T	7440-42-8	10	6	60.00	180		ug/L	Yes	----	----	----	----	750	0	0.00	No	No	----	No
MET	Cadmium	D		432	138	31.94	2.1		ug/L	Yes	4.7353851	0	0	No	5	0	0.00	No	No	----	No
MET	Chromium	D		74	35	47.30	7.6		ug/L	Yes	8.0305985	0	0	No	99.3	0	0.00	No	No	----	No
MET	Copper	D		74	48	64.86	9.5		ug/L	Yes	16.745096	0	0	No	12.1	0	0.00	No	No	----	No
MET	Lead	D	7439-92-1	74	11	14.86	5.62		ug/L	Yes	8.3182206	0	0	No	10	0	0.00	No	No	----	No
MET	Mercury	D		74	10	13.51	0.31		ug/L	Yes	0.9594613	0	0	No	1.4	0	0.00	No	No	----	No
MET	Nickel	D	7440-02-0	74	45	60.81	6	B	ug/L	Yes	27.756419	0	0	No	70.4	0	0.00	No	No	----	No
MET	Selenium	T	7782-49-2	960	410	42.71	19		ug/L	Yes	7.4081713	2	0.20833	Yes	20	0	0.00	No	No	----	No
MET	Selenium	D	7782-49-2	74	38	51.35	8.9	N	ug/L	Yes	6.1688351	3	4.05405	Yes	10	0	0.00	No	No	----	No
MET	Silver	T	7440-22-4	962	184	19.13	73.6		ug/L	Yes	6.4061355	2	0.2079	Yes	100	0	0.00	No	No	----	No
MET	Thallium	T	7440-28-0	961	72	7.49	7.1		ug/L	Yes	27.289939	0	0	No	12	0	0.00	No	No	----	No
MET	Thallium	D	7440-28-0	72	10	13.89	4.1		ug/L	Yes	30.544728	0	0	No	12	0	0.00	No	No	----	No
MET	Uranium	D		55	16	29.09	10.28		pCi/L	Yes	----	----	----	----	2442	0	0.00	No	No	----	No
PCB	PCB-1016	T	12674-11-2	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PCB	PCB-1221	T	11104-28-2	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PCB	PCB-1232	T	11141-16-5	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PCB	PCB-1242	T	53469-21-9	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PCB	PCB-1248	T	12672-29-6	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PCB	PCB-1254	T	11097-69-1	9	2	22.22	0.7		ug/L	Yes	----	----	----	----	1	0	0.00	No	No	----	No
PCB	PCB-1260	T	11096-82-5	9	0	0.00	0.5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
PEST	Hexachlorocyclopentadiene	T	77-47-4	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
RAD	Neptunium-237	T	13994-20-2	19	1	5.26	0.238		pCi/L	Yes	----	----	----	----	30	0	0.00	No	No	----	No
RAD	Uranium Isotopes	D		33	33	100.00	17.97		pCi/L	Yes	----	----	----	----	2442	0	0.00	No	No	----	No
RAD	Uranium-235	T	15117-96-1	1916	1092	56.99	0.982		pCi/L	Yes	0.1783814	110	5.74113	Yes	10	0	0.00	No	No	----	No
SVOC	1,2,4,5-Tetrachlorobenzene	T	95-94-3	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	1,2,4-Trichlorobenzene	T	120-82-1	164	4	2.44	0.2		ug/L	Yes	----	----	----	----	35	0	0.00	No	No	----	No
SVOC	2,4,5-Trichlorophenol	T	95-95-4	32	0	0.00	84	U	ug/L	Yes	----	----	----	----	700	0	0.00	----	No	----	No
SVOC	2,4,6-Trichlorophenol	T	88-06-2	32	0	0.00	33	U	ug/L	Yes	----	----	----	----	50	0	0.00	----	No	----	No
SVOC	2,4-Dichlorophenol	T	120-83-2	32	0	0.00	33	U	ug/L	Yes	----	----	----	----	50	0	0.00	----	No	----	No
SVOC	2,4-Dimethylphenol	T	105-67-9	32	0	0.00	33	U	ug/L	Yes	----	----	----	----	140	0	0.00	----	No	----	No

Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	Is Constituent an AOI ?
SVOC	2,4-Dinitrophenol	T	51-28-5	32	0	0.00	84	U	ug/L	Yes	—	—	—	—	50	0	0.00	—	No	—	No
SVOC	2,4-Dinitrotoluene	T	121-14-2	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	2,6-Dinitrotoluene	T	606-20-2	32	0	0.00	11.2	U	ug/L	Yes	—	—	—	—	230	0	0.00	—	No	—	No
SVOC	2-Chloronaphthalene	T	91-58-7	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	560	0	0.00	—	No	—	No
SVOC	2-Chlorophenol	T	95-57-8	32	0	0.00	33	U	ug/L	Yes	—	—	—	—	50	0	0.00	—	No	—	No
SVOC	2-Methylphenol	T	95-48-7	29	0	0.00	11.2	U	ug/L	Yes	—	—	—	—	1830	0	0.00	—	No	—	No
SVOC	3,3'-Dichlorobenzidine	T	91-94-1	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	4,6-Dinitro-2-methylphenol	T	534-52-1	32	0	0.00	84	U	ug/L	Yes	—	—	—	—	50	0	0.00	—	No	—	No
SVOC	4-Chloro-3-methylphenol	T	59-50-7	32	0	0.00	33	U	ug/L	Yes	—	—	—	—	50	0	0.00	—	No	—	No
SVOC	Acenaphthene	T	83-32-9	35	3	8.57	2.7	J	ug/L	Yes	—	—	—	—	420	0	0.00	No	No	—	No
SVOC	Acenaphthylene	T	208-96-8	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Aniline	T	62-53-3	1	0	0.00	10	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Anthracene	T	120-12-7	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	2100	0	0.00	—	No	—	No
SVOC	Aramite	T	140-57-8	3	0	0.00	67	U	ug/L	Yes	—	—	—	—	20	0	0.00	—	No	—	No
SVOC	Benzo(a)anthracene	T	56-55-3	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Benzo(a)pyrene	T	50-32-8	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	0.2	0	0.00	—	No	—	No
SVOC	Benzo(b)fluoranthene	T	205-99-2	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Benzo(g,h,i)perylene	T	191-24-2	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Benzo(k)fluoranthene	T	207-08-9	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	bis(2-Chloroethyl) ether	T	111-44-4	32	0	0.00	11.2	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	bis(2-Chloroisopropyl) ether	T	108-60-1	32	0	0.00	11.2	U	ug/L	Yes	—	—	—	—	280	0	0.00	—	No	—	No
SVOC	bis(2-ethylhexyl)phthalate	T	117-81-7	32	2	6.25	2	JB	ug/L	Yes	—	—	—	—	10	0	0.00	No	No	—	No
SVOC	Butylbenzylphthalate	T	85-68-7	35	3	8.57	2	J	ug/L	Yes	—	—	—	—	1400	0	0.00	No	No	—	No
SVOC	Chrysene	T	218-01-9	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Dibenz(a,h)anthracene	T	53-70-3	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Diethylphthalate	T	84-66-2	35	3	8.57	2	J	ug/L	Yes	—	—	—	—	5600	0	0.00	No	No	—	No
SVOC	Dimethylphthalate	T	131-11-3	35	3	8.57	3.6	J	ug/L	Yes	—	—	—	—	70000	0	0.00	No	No	—	No
SVOC	Di-n-butylphthalate	T	84-74-2	35	5	14.29	6	JB	ug/L	Yes	—	—	—	—	700	0	0.00	No	No	—	No
SVOC	Fluoranthene	T	206-44-0	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	130	0	0.00	—	No	—	No
SVOC	Fluorene	T	86-73-7	35	3	8.57	2.6	J	ug/L	Yes	—	—	—	—	280	0	0.00	No	No	—	No
SVOC	Hexachlorobenzene	T	118-74-1	35	0	0.00	33	U	ug/L	Yes	—	—	—	—	10	0	0.00	—	No	—	No
SVOC	Hexachlorobutadiene	T	87-68-3	164	2	1.22	0.68	JB	ug/L	Yes	—	—	—	—	10	0	0.00	No	No	—	No

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Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	Is Constituent an AOI ?
SVOC	Indeno(1,2,3-cd)pyrene	T	193-39-5	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	Isophorone	T	78-59-1	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	36	0	0.00	----	No	----	No
SVOC	Naphthalene	T	91-20-3	164	25	15.24	27		ug/L	Yes	----	----	----	----	28	0	0.00	No	No	----	No
SVOC	Nitrobenzene	T	98-95-3	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	N-Nitrosodiethylamine	T	55-18-5	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	N-Nitrosodimethylamine	T	62-75-9	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	N-Nitrosodi-n-butylamine	T	924-16-3	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	N-Nitroso-di-n-propylamine	T	621-64-7	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	n-Nitrosodiphenylamine	T	86-30-6	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	N-Nitrosomethylethylamine	T	10595-95-6	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	0.0016	0	0.00	----	No	----	No
SVOC	N-Nitrosopyrrolidine	T	930-55-2	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	Parathion	T	56-38-2	3	0	0.00	0.52	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	Pentachlorobenzene	T	608-93-5	3	0	0.00	33	U	ug/L	Yes	----	----	----	----	10	0	0.00	----	No	----	No
SVOC	Pentachlorophenol	T	87-86-5	32	0	0.00	84	U	ug/L	Yes	----	----	----	----	50	0	0.00	----	No	----	No
SVOC	Phenanthrene	T	85-01-8	35	2	5.71	3.5	J	ug/L	Yes	----	----	----	----	10	0	0.00	No	No	----	No
SVOC	Phenol	T	108-95-2	32	2	6.25	3.5	J	ug/L	Yes	----	----	----	----	2100	0	0.00	No	No	----	No
SVOC	Pyrene	T	129-00-0	35	0	0.00	33	U	ug/L	Yes	----	----	----	----	210	0	0.00	----	No	----	No
VOC	1,1,1-Trichloroethane	T	71-55-6	207	11	5.31	4	J	ug/L	Yes	----	----	----	----	200	0	0.00	No	No	----	No
VOC	1,1,2,2-Tetrachloroethane	T	79-34-5	207	1	0.48	0.1	J	ug/L	Yes	----	----	----	----	1	0	0.00	No	No	----	No
VOC	1,1,2-Trichloroethane	T	79-00-5	207	0	0.00	10	U	ug/L	Yes	----	----	----	----	2.7	0	0.00	----	No	----	No
VOC	1,1-Dichloroethane	T	75-34-3	207	32	15.46	3		ug/L	Yes	----	----	----	----	3650	0	0.00	No	No	----	No
VOC	1,1-Dichloroethene	T	75-35-4	207	7	3.38	5		ug/L	Yes	----	----	----	----	7	0	0.00	No	No	----	No
VOC	1,2-Dibromoethane	T	106-93-4	151	0	0.00	5	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
VOC	1,2-Dichlorobenzene	T	95-50-1	218	22	10.09	0.4	J	ug/L	Yes	----	----	----	----	420	0	0.00	No	No	----	No
VOC	1,2-Dichloroethane	T	107-06-2	192	0	0.00	10	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
VOC	1,2-Dichloroethene	T	540-59-0	2	0	0.00	10	U	ug/L	Yes	----	----	----	----	70	0	0.00	----	No	----	No
VOC	1,2-Dichloropropane	T	78-87-5	207	0	0.00	10	U	ug/L	Yes	----	----	----	----	1	0	0.00	----	No	----	No
VOC	1,3-Dichlorobenzene	T	541-73-1	218	10	4.59	0.82	J	ug/L	Yes	----	----	----	----	94	0	0.00	No	No	----	No
VOC	1,4-Dichlorobenzene	T	106-46-7	218	23	10.55	0.53	J	ug/L	Yes	----	----	----	----	63	0	0.00	No	No	----	No
VOC	2-Butanone	T	78-93-3	140	4	2.86	16		ug/L	Yes	----	----	----	----	21900	0	0.00	No	No	----	No
VOC	4-Methyl-2-pentanone	T	108-10-1	148	0	0.00	50	U	ug/L	Yes	----	----	----	----	2920	0	0.00	----	No	----	No
VOC	Acetone	T	67-64-1	142	50	35.21	63.1	J	ug/L	Yes	----	----	----	----	3650	0	0.00	No	No	----	No

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Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	Is Constituent an AOI ?
VOC	Bromodichloromethane	T	75-27-4	207	1	0.48	0.29	J	ug/L	Yes	-----	-----	-----	-----	1	0	0.00	No	No	-----	No
VOC	Bromoform	T	75-25-2	207	2	0.97	1.9		ug/L	Yes	-----	-----	-----	-----	4.3	0	0.00	No	No	-----	No
VOC	Bromomethane	T	74-83-9	207	0	0.00	10	U	ug/L	Yes	-----	-----	-----	-----	9.8	0	0.00	-----	No	-----	No
VOC	Carbon Disulfide	T	75-15-0	148	1	0.68	0.1	J	ug/L	Yes	-----	-----	-----	-----	3650	0	0.00	No	No	-----	No
VOC	Chlorobenzene	T	108-90-7	207	21	10.14	0.95	J	ug/L	Yes	-----	-----	-----	-----	100	0	0.00	No	No	-----	No
VOC	Chloroethane	T	75-00-3	207	25	12.08	24		ug/L	Yes	-----	-----	-----	-----	29.4	0	0.00	No	No	-----	No
VOC	Chloromethane	T	74-87-3	207	5	2.42	2.8		ug/L	Yes	-----	-----	-----	-----	5.6	0	0.00	No	No	-----	No
VOC	cis-1,3-Dichloropropene	T	10061-01-5	207	0	0.00	10	U	ug/L	Yes	-----	-----	-----	-----	1	0	0.00	-----	No	-----	No
VOC	Dibromochloromethane	T	124-48-1	207	0	0.00	10	U	ug/L	Yes	-----	-----	-----	-----	54	0	0.00	-----	No	-----	No
VOC	Ethylbenzene	T	100-41-4	207	12	5.80	1		ug/L	Yes	-----	-----	-----	-----	530	0	0.00	No	No	-----	No
VOC	Hexachloroethane	T	67-72-1	35	0	0.00	33	U	ug/L	Yes	-----	-----	-----	-----	10	0	0.00	-----	No	-----	No
VOC	m,p-Xylene	T		9	0	0.00	5	U	ug/L	Yes	-----	-----	-----	-----	1400	0	0.00	-----	No	-----	No
VOC	o-Xylene	T	95-47-6	9	0	0.00	5	U	ug/L	Yes	-----	-----	-----	-----	1400	0	0.00	-----	No	-----	No
VOC	Styrene	T	100-42-5	153	1	0.65	3		ug/L	Yes	-----	-----	-----	-----	100	0	0.00	No	No	-----	No
VOC	Toluene	T	108-88-3	207	46	22.22	10	J	ug/L	Yes	-----	-----	-----	-----	1000	0	0.00	No	No	-----	No
VOC	Total Xylenes	T	1330-20-7	153	19	12.42	4.1		ug/L	Yes	-----	-----	-----	-----	1400	0	0.00	No	No	-----	No
VOC	trans-1,2-Dichloroethene	T	156-60-5	205	1	0.49	0.7		ug/L	Yes	-----	-----	-----	-----	100	0	0.00	No	No	-----	No
VOC	trans-1,3-Dichloropropene	T	10061-02-6	207	0	0.00	10	U	ug/L	Yes	-----	-----	-----	-----	1	0	0.00	-----	No	-----	No
MET	Silver	D		432	21	4.86	32.4		ug/L	Yes	8.9873432	1	0.23148	Yes	5	1	0.23	Yes	No	-----	No
MET	Copper	T	7440-50-8	960	918	95.63	259		ug/L	Yes	22.277018	254	26.4583	Yes	200	3	0.31	Yes	No	-----	No
MET	Mercury	T	7439-97-6	877	138	15.74	5.5		ug/L	Yes	0.2708008	34	3.87685	Yes	1	5	0.57	Yes	No	-----	No
RAD	Uranium-233/234	T		1916	1888	98.54	26.7		pCi/L	Yes	1.9728395	437	22.8079	Yes	10	11	0.57	Yes	No	-----	No
MET	Cadmium	T	7440-43-9	971	668	68.80	16.5		ug/L	Yes	3.1512165	26	2.67765	Yes	5	7	0.72	Yes	No	-----	No
MET	Arsenic	T	7440-38-2	960	781	81.35	147		ug/L	Yes	12.389544	84	8.75	Yes	50	8	0.83	Yes	No	-----	No
MET	Barium	T	7440-39-3	960	959	99.90	2560		ug/L	Yes	236.0217	256	26.6667	Yes	1000	8	0.83	Yes	No	-----	No
RAD	Tritium	T	10028-17-8	358	20	5.59	575		pCi/L	Yes	439.38297	3	0.83799	Yes	500	3	0.84	Yes	No	-----	No
WQP	Fluoride	T	ConID 209	110	106	96.36	9600		ug/L	Yes	585.82092	4	3.63636	Yes	2000	1	0.91	Yes	No	-----	No
WQP	Sulfate	T	14808-79-8	110	109	99.09	350000		ug/L	Yes	42709.314	10	9.09091	Yes	250000	1	0.91	Yes	No	-----	No
VOC	Benzene	T	71-43-2	207	28	13.53	4.7		ug/L	Yes	-----	-----	-----	-----	2.2	2	0.97	Yes	No	-----	No
MET	Nickel	T	7440-02-0	960	923	96.15	272		ug/L	Yes	35.639223	61	6.35417	Yes	100	11	1.15	Yes	Yes	-----	Yes
RAD	Uranium-238	T	7440-61-1	1916	1893	98.80	30.8		pCi/L	Yes	1.8403769	430	22.4426	Yes	10	22	1.15	Yes	Yes	Eliminated	No
MET	Beryllium	T	7440-41-7	1309	887	67.76	25.5		ug/L	Yes	2.4899242	53	4.04889	Yes	5	16	1.22	Yes	Yes	-----	Yes

Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	Is Constituent an AOI ?
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	
VOC	cis-1,2-Dichloroethene	T	156-59-2	151	25	16.56	210		ug/L	Yes	----	-----	-----	----	70	2	1.32	Yes	Yes	-----	Yes
MET	Antimony	D		74	37	50.00	10.2		ug/L	Yes	103.92488	0	0	No	10	1	1.35	Yes	Yes	-----	No
VOC	Vinyl Chloride	T	75-01-4	207	23	11.11	9.7		ug/L	Yes	-----	-----	----	----	2	3	1.45	Yes	Yes	-----	Yes
MET	Zinc	T	7440-66-6	959	868	90.51	12200		ug/L	Yes	544.1721	127	13.243	Yes	2000	21	2.19	Yes	Yes	-----	Yes
VOC	Chloroform	T	67-66-3	207	56	27.05	120	D	ug/L	Yes	----	-----	-----	-----	3.4	6	2.90	Yes	Yes	-----	Yes
MET	Uranium	T		784	140	17.86	52.77	B	pCi/L	Yes	7.8897978	36	4.59184	Yes	10	27	3.44	Yes	Yes	Eliminated	No
VOC	Methylene Chloride	T	75-09-2	207	57	27.54	15	BD	ug/L	Yes	-----	-----	-----	----	4.6	8	3.86	Yes	Yes	-----	Yes
MET	Chromium	T	7440-47-3	1318	1178	89.38	348		ug/L	Yes	56.406254	44	3.33839	Yes	50	52	3.95	Yes	Yes	-----	Yes
MET	Aluminum	D		73	34	46.58	1330		ug/L	Yes	429.9607	2	2.73973	Yes	87	3	4.11	Yes	Yes	-----	Yes
RAD	Uranium Isotopes	T		1788	1788	100.00	56.28		pCi/L	Yes	7.8897978	112	6.26398	Yes	10	75	4.19	Yes	Yes	-----	Yes
WQP	Chloride	T	16887-00-6	110	110	100.00	340000		ug/L	Yes	44941.685	50	45.4545	Yes	250000	5	4.55	Yes	Yes	Eliminated	No
VOC	Trichloroethene	T	79-01-6	207	28	13.53	66		ug/L	Yes	-----	-----	----	-----	2.5	10	4.83	Yes	Yes	-----	Yes
MET	Lead	T	7439-92-1	954	748	78.41	262		ug/L	Yes	18.174037	173	18.1342	Yes	50	49	5.14	Yes	Yes	-----	Yes
VOC	Tetrachloroethene	T	127-18-4	204	26	12.75	44		ug/L	Yes	-----	-----	-----	-----	1	12	5.88	Yes	Yes	-----	Yes
MET	Zinc	D		74	66	89.19	354		ug/L	Yes	427.51233	0	0	No	158.7	5	6.76	Yes	Yes	-----	No[1]
VOC	Carbon Tetrachloride	T	56-23-5	207	27	13.04	310	D	ug/L	Yes	----	-----	-----	-----	1	22	10.63	Yes	Yes	-----	Yes
MET	Antimony	T	7440-36-0	959	625	65.17	108		ug/L	Yes	71.058087	3	0.31283	Yes	10	106	11.05	Yes	Yes	-----	No[1]
MET	Iron	D	7439-89-6	74	53	71.62	46000		ug/L	Yes	13148.724	1	1.35135	Yes	300	11	14.86	Yes	Yes	Eliminated	No
RAD	Gross Alpha	T	12587-47-2	32	13	40.63	521		pCi/L	Yes	18.285124	3	9.375	Yes	7	5	15.63	Yes	Yes	-----	Yes
WQP	Nitrate/Nitrite (as N)	T	ConID 184	636	603	94.81	1200000		ug/L	Yes	3484.7901	270	42.4528	Yes	10000	104	16.35	Yes	Yes	-----	Yes
RAD	Americium-241	T	86954-36-1	2078	881	42.40	84		pCi/L	Yes	0.0232594	821	39.5091	Yes	0.15	353	16.99	Yes	Yes	-----	Yes
RAD	Gross Beta	T	12587-46-1	32	24	75.00	398		pCi/L	Yes	14.995852	3	9.375	Yes	8	6	18.75	Yes	Yes	-----	Yes
WQP	Ammonia (as N)	T	ConID 170	285	204	71.58	4400		ug/L	Yes	-----	-----	----	-----	500	54	18.95	Yes	Yes	Eliminated	No
RAD	Plutonium-239/240	T		2110	1015	48.10	259		pCi/L	Yes	0.0187389	981	46.4929	Yes	0.15	434	20.57	Yes	Yes	-----	Yes
MET	Manganese	T	7439-96-5	960	956	99.58	4470		ug/L	Yes	757.75188	109	11.3542	Yes	200	338	35.21	Yes	Yes	Eliminated	No
WQP	Cyanide	T	57-12-5	2	2	100.00	36.5		ug/L	Yes	934.5468	0	0	No	5	1	50.00	Yes	Yes	-----	No[1]
MET	Manganese	D		74	64	86.49	1400		ug/L	Yes	378.3144	11	14.8649	Yes	50	38	51.35	Yes	Yes	Eliminated	No
MET	Iron	T	7439-89-6	960	953	99.27	398000		ug/L	Yes	23460.732	128	13.3333	Yes	1000	717	74.69	Yes	Yes	Eliminated	No

Notes

----- Not Applicable

[ ] The frequency of detection of the analyte concentration above the *lowest surface water standard or PQL, whichever is higher, is greater than (>) 0 % and less than (<) 1 %.*

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Table 5.2
Surface Water AOI Screening For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	Is Constituent an AOI ?

The frequency of detection of the analyte concentration above the lowest surface water standard or PQL, whichever is higher, is greater than (>) or equal to 1 % and less than (<) 5 %.

The frequency of detection of the analyte concentration above the lowest surface water standard or PQL, whichever is higher, is greater than (>) 5 %.

[1]Although dissolved antimony, dissolved zinc, and cyanide have a frequency of detection above 1%, they were not retained as an AOI because their maximum result was less than the background mean + 2 standard deviations.

Table 5.3
Surface Water AOIs Eliminated or Retained Based On Process Knowledge

Analyte	Basis for Eliminating Constituent as a Surface Water AOI
Iron	Dissolved iron was not retained as an AOI because it only occurs above the surface water standard at the former Present Landfill seep which has been remediated. Total iron was not retained as an AOI because it is a ubiquitous, naturally-occurring constituent of the particulates that comprise the total iron analysis. Iron commonly occurs as a chemical component of the particulate, suspended ferric oxyhydroxides, and as coatings on particulates. Based on results of different exposure scenarios, iron was not carried forward as a material of concern for the ChemRisk process (DOE, 2005).
Manganese	Manganese was eliminated as an AOI based on process knowledge that it was not identified or discussed in building process information (CDH, 1992; DOE, 2004d). Manganese has not been found associated with UBC sites (DOE, 2004d). Only small quantities were identified to be in inventory with the exception of manganous sulfate which had an inventory in 1974 of 2560 kilograms and then later in 1988 of 0.06 kilograms (the specific use was not clear in the ChemRisk reports). Based on results of different exposure scenarios, manganese was not carried forward as a material of concern for the ChemRisk process (DOE, 2005).
Uranium	Although uranium (as a metal) has a frequency of detection above 1%, it was not retained as an AOI. Total uranium isotopes, which is the sum of the individual uranium-233, -234, -235, and –238, was retained as the uranium AOI instead.
Uranium-238	Although uranium-238 has a frequency of detection above 1%, it was not retained as an AOI because there is not a surface water standard for indvidual uranium isotopes. Total uranium isotopes, which is the sum of the individual uranium-233, -234, -235, and –238, was retained as the uranium AOI instead.
Chloride	Although chloride has a frequency of detection above 1%, it was not retained as an AOI because the primary source of chloride at RFETS was salt used as a deicer on roads during the winter.
Ammonia (as N)	Although ammonia (as N) has a frequency of detection above 1%, it was not retained as an AOI because its only occurrence is at the Present Landfill seep. A final remedial action has been taken at the Present Landfill.

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Table 5.4
Surface Water AOIs For Results From January 1, 2000 To Present

Analyte Group	Analyte	Total or Dissolved	Derived CAS	Number of Samples	Number of Detections	Frequency of Detections (%)	Maximum Concentration	Data Qualifier	Unit	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	AOI Screen 5	Is Constituent an AOI ?
										Is There a Surface Water Standard ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	Lowest Surface Water Standard or PQL	Number of Detections Above the Lowest Surface Water Standard or PQL	Frequency of Detection (%) Above the Surface Water Standard or PQL	Is the Maximum Result Above the Surface Water Standard or PQL ?	Is the Frequency of Detection Above the Surface Water Standard ≥ 1% ?	Is Constituent Eliminated or Retained By Process Knowledge ?	
MET	Nickel	T	7440-02-0	960	923	96.15	272		ug/L	Yes	35.6	61	6.35	Yes	100	11	1.15	Yes	Yes	-----	Yes
MET	Beryllium	T	7440-41-7	1309	887	67.76	25.5		ug/L	Yes	2.49	53	4.05	Yes	5	16	1.22	Yes	Yes	-----	Yes
VOC	cis-1,2-Dichloroethene	T	156-59-2	151	25	16.56	210		ug/L	Yes	-----	-----	-----	-----	70	2	1.32	Yes	Yes	-----	Yes
VOC	Vinyl Chloride	T	75-01-4	207	23	11.11	9.7		ug/L	Yes	-----	-----	-----	-----	2	3	1.45	Yes	Yes	-----	Yes
MET	Zinc	T	7440-66-6	959	868	90.51	12200		ug/L	Yes	544	127	13.24	Yes	2000	21	2.19	Yes	Yes	-----	Yes
VOC	Chloroform	T	67-66-3	207	56	27.05	120	D	ug/L	Yes	-----	-----	-----	-----	3.4	6	2.90	Yes	Yes	-----	Yes
VOC	Methylene Chloride	T	75-09-2	207	57	27.54	15	BD	ug/L	Yes	-----	-----	-----	-----	4.6	8	3.86	Yes	Yes	-----	Yes
MET	Chromium	T	7440-47-3	1318	1178	89.38	348		ug/L	Yes	56.4	44	3.34	Yes	50	52	3.95	Yes	Yes	-----	Yes
MET	Aluminum	D		73	34	46.58	1330		ug/L	Yes	430	2	2.74	Yes	87	3	4.11	Yes	Yes	-----	Yes
RAD	Uranium Isotopes	T		1788	1788	100.00	56.282		pCi/L	Yes	7.89	112	6.26	Yes	10	75	4.19	Yes	Yes	-----	Yes
VOC	Trichloroethene	T	79-01-6	207	28	13.53	66		ug/L	Yes	-----	-----	-----	-----	2.5	10	4.83	Yes	Yes	-----	Yes
MET	Lead	T	7439-92-1	954	748	78.41	262		ug/L	Yes	18.2	173	18.13	Yes	50	49	5.14	Yes	Yes	-----	Yes
VOC	Tetrachloroethene	T	127-18-4	204	26	12.75	44		ug/L	Yes	-----	-----	-----	-----	1	12	5.88	Yes	Yes	-----	Yes
VOC	Carbon Tetrachloride	T	56-23-5	207	27	13.04	310	D	ug/L	Yes	-----	-----	-----	-----	1	22	10.63	Yes	Yes	-----	Yes
RAD	Gross Alpha	T	12587-47-2	32	13	40.63	521		pCi/L	Yes	18.3	3	9.38	Yes	7	5	15.63	Yes	Yes	-----	Yes
WQP	Nitrate/Nitrite (as N)	T	ConID 184	636	603	94.81	1200000		ug/L	Yes	3485	270	42.45	Yes	10000	104	16.35	Yes	Yes	-----	Yes
RAD	Americium-241	T	86954-36-1	2078	881	42.40	84		pCi/L	Yes	0.02	821	39.51	Yes	0.15	353	16.99	Yes	Yes	-----	Yes
RAD	Gross Beta	T	12587-46-1	32	24	75.00	398		pCi/L	Yes	15.0	3	9.38	Yes	8	6	18.75	Yes	Yes	-----	Yes
RAD	Plutonium-239/240	T		2110	1015	48.10	259		pCi/L	Yes	0.02	981	46.49	Yes	0.15	434	20.57	Yes	Yes	-----	Yes

Notes

----- Not Applicable

	The frequency of detection of the analyte concentration above the lowest surface water standard or PQL, whichever is higher, is greater than (>) 0 % and less than (<) 1 %.
	The frequency of detection of the analyte concentration above the lowest surface water standard or PQL, whichever is higher, is greater than (>) or equal to 1 % and less than (<) 5 %.
	The frequency of detection of the analyte concentration above the lowest surface water standard or PQL, whichever is higher, is greater than (>) 5 %.

Table 5.5
Summary of Surface Water AOIs By Drainage Basin

Drainage Basin	Surface Water AOI
Walnut Creek	Carbon Tetrachloride
Walnut Creek	Chloroform
Walnut Creek	cis-1,2-Dichloroethene
Walnut Creek	Methylene Chloride
Walnut Creek	Tetrachloroethene
Walnut Creek, Woman Creek	Trichloroethene
Walnut Creek	Vinyl Chloride
Walnut Creek	Dissolved Aluminum
Walnut Creek, Woman Creek	Total Beryllium
Walnut Creek, Woman Creek	Total Chromium
Walnut Creek, Woman Creek	Total Lead
Walnut Creek	Total Nickel
Walnut Creek	Total Zinc
Walnut Creek, Woman Creek	Total Americium-241
Walnut Creek	Total Gross Alpha
Walnut Creek	Total Gross Beta
Walnut Creek, Woman Creek, Rock Creek	Total Plutonium-239/240
Walnut Creek, Woman Creek	Total Uranium Isotopes
Walnut Creek	Nitrate/Nitrite (as N)

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	Is Constituent an AOI ?
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	
DIOXINS	123478-HxCDD	39227-28-6	6	1	16.67	0.00126	J	ug/kg	Yes	-----	-----	-----	---	0.48	0	0.00	---	-----	No
DIOXINS	123678-HxCDD	57653-85-7	6	2	33.33	0.00455		ug/kg	Yes	-----	-----	-----	---	0.48	0	0.00	---	-----	No
DIOXINS	123789-HxCDD	19408-74-3	6	2	33.33	0.00329		ug/kg	Yes	-----	-----	-----	---	0.48	0	0.00	---	-----	No
DIOXINS	2378-TCDD	1746-01-6	6	1	16.67	0.00278		ug/kg	Yes	-----	-----	-----	---	0.02	0	0.00	---	-----	No
HERB	2,4,5-T	93-76-5	1	0	0.00	60	U	ug/kg	Yes	-----	-----	-----	---	801440	0	0.00	---	-----	No
HERB	2,4,5-TP (Silvex)	93-72-1	1	0	0.00	60	U	ug/kg	Yes	-----	-----	-----	---	169369	0	0.00	---	-----	No
HERB	2,4-D	94-75-7	1	0	0.00	180	U	ug/kg	Yes	-----	-----	-----	---	801435	0	0.00	---	-----	No
HERB	2,4-DB	94-82-6	1	0	0.00	1400	U	ug/kg	Yes	-----	-----	-----	---	641148	0	0.00	---	-----	No
HERB	4-Nitrophenol	100-02-7	289	1	0.35	1300	J	ug/kg	Yes	-----	-----	-----	---	641148	0	0.00	---	-----	No
HERB	Dalapon	75-99-0	1	0	0.00	2300	U	ug/kg	Yes	-----	-----	-----	---	2404306	0	0.00	---	-----	No
HERB	Dicamba	1918-00-9	1	0	0.00	96	U	ug/kg	Yes	-----	-----	-----	---	2404306	0	0.00	---	-----	No
HERB	Dinoseb	88-85-7	1	0	0.00	84	U	ug/kg	Yes	-----	-----	-----	---	80144	0	0.00	---	-----	No
HERB	MCPA	94-74-6	1	0	0.00	94000	U	ug/kg	Yes	-----	-----	-----	---	40072	0	0.00	---	-----	No
HERB	MCPP	93-65-2	1	0	0.00	140000	U	ug/kg	Yes	-----	-----	-----	---	80144	0	0.00	---	-----	No
METAL	Barium	7440-39-3	386	385	99.74	404000		ug/kg	Yes	196504	47	12.18	Yes	2872415	0	0.00	---	-----	No
METAL	Beryllium	7440-41-7	380	273	71.84	6700		ug/kg	Yes	1468	18	4.74	Yes	100105	0	0.00	---	-----	No
METAL	Boron	7440-42-8	106	103	97.17	30000		ug/kg	Yes	-----	-----	-----	---	9476518	0	0.00	---	-----	No
METAL	Cadmium	7440-43-9	377	155	41.11	44000		ug/kg	Yes	1215	40	10.61	Yes	91387	0	0.00	---	-----	No
METAL	Chromium VI	18540-29-9	42	14	33.33	13		ug/kg	Yes	-----	-----	-----	---	28418	0	0.00	---	-----	No
METAL	Cobalt	7440-48-4	384	360	93.75	20100		ug/kg	Yes	12587	16	4.17	Yes	121791	0	0.00	---	-----	No
METAL	Copper	7440-50-8	386	370	95.85	324000		ug/kg	Yes	27633	42	10.88	Yes	4443478	0	0.00	---	-----	No
METAL	Lead	7439-92-1	386	386	100.00	234000	*	ug/kg	Yes	38052	46	11.92	Yes	1000000	0	0.00	---	-----	No
METAL	Lithium	7439-93-2	379	321	84.70	37000		ug/kg	Yes	20454	13	3.43	Yes	2221739	0	0.00	---	-----	No
METAL	Mercury	7439-97-6	353	129	36.54	3800		ug/kg	Yes	200	17	4.82	Yes	32925	0	0.00	---	-----	No
METAL	Molybdenum	7439-98-7	378	139	36.77	11700		ug/kg	Yes	16791	0	0.00	---	555435	0	0.00	---	-----	No
METAL	Nickel	7440-02-0	385	354	91.95	216000		ug/kg	Yes	17557	104	27.01	Yes	2221739	0	0.00	---	-----	No
METAL	Selenium	7782-49-2	375	91	24.27	3800	B	ug/kg	Yes	1726	14	3.73	Yes	555435	0	0.00	---	-----	No
METAL	Strontium	7440-24-6	383	382	99.74	526000		ug/kg	Yes	151351	8	2.09	Yes	66652174	0	0.00	---	-----	No
METAL	Tin	7440-31-5	377	65	17.24	77200		ug/kg	Yes	70911	1	0.27	Yes	66652174	0	0.00	---	-----	No
METAL	Titanium	7440-32-6	106	106	100.00	330000		ug/kg	Yes	-----	-----	-----	---	169568303	0	0.00	---	-----	No

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	Is Constituent an AOI ?
METAL	Uranium	11-09-6	135	8	5.93	13.7054		pCi/g	Yes	-----	----	-----	---	228	0	0.00	---	-----	No
METAL	Vanadium	7440-62-2	386	378	97.93	96000		ug/kg	Yes	51319	26	6.74	Yes	111087	0	0.00	---	-----	No
METAL	Zinc	7440-66-6	386	385	99.74	2080000	*	ug/kg	Yes	329843	29	7.51	Yes	33326087	0	0.00	---	-----	No
PCB	PCB-1016	12674-11-2	313	0	0.00	990	U	ug/kg	Yes	-----	----	-----	---	1349	0	0.00	---	-----	No
PCB	PCB-1221	11104-28-2	313	0	0.00	990	U	ug/kg	Yes	-----	-----	-----	---	1349	0	0.00	---	-----	No
PCB	PCB-1232	11141-16-5	313	0	0.00	990	U	ug/kg	Yes	-----	-----	----	---	1349	0	0.00	---	-----	No
PCB	PCB-1242	53469-21-9	313	0	0.00	990	U	ug/kg	Yes	-----	-----	-----	---	1349	0	0.00	---	-----	No
PCB	PCB-1248	12672-29-6	313	0	0.00	990	U	ug/kg	Yes	-----	----	----	---	1349	0	0.00	---	-----	No
PEST	4,4'-DDD	72-54-8	231	0	0.00	200	U	ug/kg	Yes	-----	----	----	---	15528	0	0.00	---	-----	No
PEST	4,4'-DDE	72-55-9	231	1	0.43	4.1	J	ug/kg	Yes	----	----	-----	---	10961	0	0.00	---	-----	No
PEST	4,4'-DDT	50-29-3	231	5	2.16	18	J	ug/kg	Yes	----	-----	-----	---	10927	0	0.00	---	-----	No
PEST	Aldrin	309-00-2	229	3	1.31	54		ug/kg	Yes	----	-----	-----	---	176	0	0.00	---	-----	No
PEST	alpha-BHC	319-84-6	231	0	0.00	99	U	ug/kg	Yes	-----	-----	----	---	570	0	0.00	---	-----	No
PEST	alpha-Chlordane	5103-71-9	229	2	0.87	0	I	ug/kg	Yes	-----	----	----	---	10261	0	0.00	---	-----	No
PEST	Atrazine	1912-24-9	5	1	20.00	120		ug/kg	Yes	-----	----	----	---	13636	0	0.00	---	-----	No
PEST	beta-BHC	319-85-7	231	3	1.30	28		ug/kg	Yes	----	-----	-----	---	1995	0	0.00	---	-----	No
PEST	beta-Chlordane	5103-74-2	157	0	0.00	400	U	ug/kg	Yes	-----	-----	-----	---	10261	0	0.00	---	-----	No
PEST	Chlordane		2	0	0.00	94	U	ug/kg	Yes	-----	----	----	---	10261	0	0.00	---	-----	No
PEST	delta-BHC	319-86-8	231	3	1.30	13		ug/kg	Yes	----	-----	-----	---	570	0	0.00	---	-----	No
PEST	Dieldrin	60-57-1	231	1	0.43	4.6	J	ug/kg	Yes	----	-----	-----	---	187	0	0.00	---	-----	No
PEST	Endosulfan I	959-98-8	231	3	1.30	20	J	ug/kg	Yes	-----	----	----	---	480861	0	0.00	---	-----	No
PEST	Endosulfan II	33213-65-9	231	0	0.00	200	U	ug/kg	Yes	-----	-----	----	---	480861	0	0.00	---	-----	No
PEST	Endosulfan sulfate	1031-07-8	231	0	0.00	200	U	ug/kg	Yes	----	-----	-----	---	480861	0	0.00	---	-----	No
PEST	Endrin	72-20-8	231	0	0.00	200	U	ug/kg	Yes	-----	----	----	---	24043	0	0.00	---	-----	No
PEST	Endrin aldehyde	7421-93-4	53	0	0.00	27	U	ug/kg	Yes	----	----	----	---	24043	0	0.00	---	-----	No
PEST	Endrin ketone	53494-70-5	221	0	0.00	200	U	ug/kg	Yes	----	----	-----	---	33326	0	0.00	---	-----	No
PEST	gamma-BHC (Lindane)	58-89-9	230	2	0.87	25		ug/kg	Yes	----	----	-----	---	2771	0	0.00	---	-----	No
PEST	gamma-Chlordane	12789-03-6	72	2	2.78	0	I	ug/kg	Yes	-----	----	----	---	10261	0	0.00	---	-----	No
PEST	Heptachlor	76-44-8	231	3	1.30	3.1	J	ug/kg	Yes	-----	----	----	---	665	0	0.00	---	-----	No
PEST	Heptachlor epoxide	1024-57-3	231	3	1.30	33		ug/kg	Yes	----	----	-----	---	329	0	0.00	---	-----	No

Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	Is Constituent an AOI ?
PEST	Hexachlorocyclopentadiene	77-47-4	283	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	380452	0	0.00	---	-----	No
PEST	Methoxychlor	72-43-5	231	1	0.43	2.7	J	ug/kg	Yes	-----	----	-----	---	400718	0	0.00	---	-----	No
PEST	Simazine	122-34-9	4	0	0.00	50	U	ug/kg	Yes	-----	----	-----	---	25000	0	0.00	---	-----	No
PEST	Toxaphene	8001-35-2	231	0	0.00	2300	U	ug/kg	Yes	-----	----	-----	---	2720	0	0.00	---	-----	No
RAD	Strontium-89/90		200	149	74.50	4.86		pCi/g	Yes	0.58	23	11.50	Yes	13	0	0.00	---	-----	No
RAD	Uranium Isotopes		387	387	100.00	69.6587		pCi/g	Yes	-----	-----	-----	---	228	0	0.00	---	-----	No
RAD	Uranium-233/234		423	422	99.76	15		pCi/g	Yes	3.92	7	1.65	Yes	25	0	0.00	---	-----	No
RAD	Uranium-235	15117-96-1	423	249	58.87	0.8517		pCi/g	Yes	0.15	22	5.20	Yes	1.05	0	0.00	---	-----	No
SVOC	1,2,4-Trichlorobenzene	120-82-1	313	1	0.32	2	J	ug/kg	Yes	-----	----	-----	---	151360	0	0.00	---	-----	No
SVOC	2,4,5-Trichlorophenol	95-95-4	292	0	0.00	10000	U	ug/kg	Yes	-----	----	-----	---	8014354	0	0.00	---	-----	No
SVOC	2,4,6-Trichlorophenol	88-06-2	292	0	0.00	3600	U	ug/kg	Yes	-----	-----	-----	---	272055	0	0.00	---	-----	No
SVOC	2,4-Dichlorophenol	120-83-2	291	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	240431	0	0.00	---	-----	No
SVOC	2,4-Dimethylphenol	105-67-9	291	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	1602871	0	0.00	---	-----	No
SVOC	2,4-Dinitrophenol	51-28-5	274	1	0.36	890	J	ug/kg	Yes	-----	----	-----	---	160287	0	0.00	---	-----	No
SVOC	2,4-Dinitrotoluene	121-14-2	292	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	160287	0	0.00	---	-----	No
SVOC	2,6-Dinitrotoluene	606-20-2	291	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	80144	0	0.00	---	-----	No
SVOC	2-Chloronaphthalene	91-58-7	291	0	0.00	3600	U	ug/kg	Yes	-----	-----	-----	---	6411483	0	0.00	---	-----	No
SVOC	2-Chlorophenol	95-57-8	291	0	0.00	3600	U	ug/kg	Yes	-----	----	-----	---	555435	0	0.00	---	-----	No
SVOC	2-Methylnaphthalene	91-57-6	291	9	3.09	2000		ug/kg	Yes	-----	-----	-----	---	320574	0	0.00	---	-----	No
SVOC	2-Methylphenol	95-48-7	292	1	0.34	200	J	ug/kg	Yes	-----	-----	-----	---	4007177	0	0.00	---	-----	No
SVOC	2-Nitroaniline	88-74-4	291	0	0.00	18000	U	ug/kg	Yes	-----	----	-----	---	192137	0	0.00	---	-----	No
SVOC	3,3'-Dichlorobenzidine	91-94-1	283	0	0.00	7100	U	ug/kg	Yes	-----	-----	-----	---	6667	0	0.00	---	-----	No
SVOC	4,6-Dinitro-2-methylphenol	534-52-1	280	2	0.71	1100	J	ug/kg	Yes	-----	----	-----	---	8014	0	0.00	---	-----	No
SVOC	4-Chloroaniline	106-47-8	284	0	0.00	7100	U	ug/kg	Yes	-----	-----	-----	---	320574	0	0.00	---	-----	No
SVOC	4-Methylphenol	106-44-5	293	9	3.07	1500	J	ug/kg	Yes	-----	-----	-----	---	400718	0	0.00	---	-----	No
SVOC	4-Nitroaniline	100-01-6	283	0	0.00	18000	U	ug/kg	Yes	-----	----	-----	---	207917	0	0.00	---	-----	No
SVOC	Acenaphthene	83-32-9	291	41	14.09	620		ug/kg	Yes	-----	----	-----	---	4437768	0	0.00	---	-----	No
SVOC	Anthracene	120-12-7	291	76	26.12	970		ug/kg	Yes	-----	-----	-----	---	22188842	0	0.00	---	-----	No
SVOC	Benzo(a)anthracene	56-55-3	291	126	43.30	1400		ug/kg	Yes	-----	-----	-----	---	3793	0	0.00	---	-----	No
SVOC	Benzo(b)fluoranthene	205-99-2	290	111	38.28	1500		ug/kg	Yes	-----	-----	-----	---	3793	0	0.00	---	-----	No

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	Is Constituent an AOI ?
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	
SVOC	Benzo(k)fluoranthene	207-08-9	290	85	29.31	1200	J	ug/kg	Yes	---	---	---	---	37927	0	0.00	---	---	No
SVOC	Benzoic Acid	65-85-0	237	30	12.66	2700	J	ug/kg	Yes	---	---	---	---	320574148	0	0.00	---	---	No
SVOC	Benzyl Alcohol	100-51-6	241	1	0.41	41	J	ug/kg	Yes	---	---	---	---	24043061	0	0.00	---	---	No
SVOC	bis(2-Chloroethyl) ether	111-44-4	291	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	3767	0	0.00	---	---	No
SVOC	bis(2-Chloroisopropyl) ether	108-60-1	288	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	59301	0	0.00	---	---	No
SVOC	bis(2-ethylhexyl)phthalate	117-81-7	291	153	52.58	47000		ug/kg	Yes	---	---	---	---	213750	0	0.00	---	---	No
SVOC	Butylbenzylphthalate	85-68-7	291	16	5.50	1700		ug/kg	Yes	---	---	---	---	16028707	0	0.00	---	---	No
SVOC	Carbazole	86-74-8	50	19	38.00	300	J	ug/kg	Yes	---	---	---	---	150001	0	0.00	---	---	No
SVOC	Chrysene	218-01-9	292	142	48.63	1500		ug/kg	Yes	---	---	---	---	379269	0	0.00	---	---	No
SVOC	Dibenzofuran	132-64-9	291	11	3.78	300	J	ug/kg	Yes	---	---	---	---	222174	0	0.00	---	---	No
SVOC	Diethylphthalate	84-66-2	292	3	1.03	79	J	ug/kg	Yes	---	---	---	---	64114830	0	0.00	---	---	No
SVOC	Dimethylphthalate	131-11-3	291	4	1.37	490	J	ug/kg	Yes	---	---	---	---	801435369	0	0.00	---	---	No
SVOC	Di-n-butylphthalate	84-74-2	292	68	23.29	390	J	ug/kg	Yes	---	---	---	---	8014354	0	0.00	---	---	No
SVOC	Di-n-octylphthalate	117-84-0	291	23	7.90	9800		ug/kg	Yes	---	---	---	---	3205741	0	0.00	---	---	No
SVOC	Fluoranthene	206-44-0	292	160	54.79	3100		ug/kg	Yes	---	---	---	---	2958512	0	0.00	---	---	No
SVOC	Fluorene	86-73-7	291	28	9.62	650		ug/kg	Yes	---	---	---	---	3205741	0	0.00	---	---	No
SVOC	Hexachlorobenzene	118-74-1	292	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	1870	0	0.00	---	---	No
SVOC	Hexachlorobutadiene	87-68-3	313	1	0.32	2	J	ug/kg	Yes	---	---	---	---	22217	0	0.00	---	---	No
SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	288	80	27.78	910		ug/kg	Yes	---	---	---	---	3793	0	0.00	---	---	No
SVOC	Isophorone	78-59-1	291	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	3157922	0	0.00	---	---	No
SVOC	Naphthalene	91-20-3	313	20	6.39	320	J	ug/kg	Yes	---	---	---	---	1403301	0	0.00	---	---	No
SVOC	Nitrobenzene	98-95-3	292	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	43246	0	0.00	---	---	No
SVOC	N-Nitroso-di-n-propylamine	621-64-7	291	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	429	0	0.00	---	---	No
SVOC	n-Nitrosodiphenylamine	86-30-6	291	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	612250	0	0.00	---	---	No
SVOC	Pentachlorophenol	87-86-5	292	6	2.05	1500	J	ug/kg	Yes	---	---	---	---	17633	0	0.00	---	---	No
SVOC	Phenol	108-95-2	291	5	1.72	150	J	ug/kg	Yes	---	---	---	---	24043061	0	0.00	---	---	No
SVOC	Pyrene	129-00-0	292	139	47.60	3900		ug/kg	Yes	---	---	---	---	2218884	0	0.00	---	---	No
VOC	1,1,1,2-Tetrachloroethane	630-20-6	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	91018	0	0.00	---	---	No
VOC	1,1,1-Trichloroethane	71-55-6	248	1	0.40	9	J	ug/kg	Yes	---	---	---	---	9178628	0	0.00	---	---	No
VOC	1,1,2,2-Tetrachloroethane	79-34-5	247	1	0.40	2	J	ug/kg	Yes	---	---	---	---	10483	0	0.00	---	---	No

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	Is Constituent an AOI ?
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	2383408104	0	0.00	---	-----	No
VOC	1,1,2-Trichloroethane	79-00-5	248	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	28022	0	0.00	---	-----	No
VOC	1,1-Dichloroethane	75-34-3	249	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	2715777	0	0.00	---	-----	No
VOC	1,1-Dichloroethene	75-35-4	248	1	0.40	2	J	ug/kg	Yes	---	---	---	---	17366	0	0.00	---	-----	No
VOC	1,2,3-Trichloropropane	96-18-4	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	2079	0	0.00	---	-----	No
VOC	1,2,4-Trimethylbenzene	95-63-6	49	6	12.24	4.6	J	ug/kg	Yes	---	---	---	---	132620	0	0.00	---	-----	No
VOC	1,2-Dibromoethane	106-93-4	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	35	0	0.00	---	-----	No
VOC	1,2-Dichlorobenzene	95-50-1	264	0	0.00	2700	U	ug/kg	Yes	---	---	---	---	2891221	0	0.00	---	-----	No
VOC	1,2-Dichloroethane	107-06-2	245	1	0.41	5	J	ug/kg	Yes	---	---	---	---	13270	0	0.00	---	-----	No
VOC	1,2-Dichloroethene	540-59-0	200	1	0.50	3	J	ug/kg	Yes	---	---	---	---	999783	0	0.00	---	-----	No
VOC	1,2-Dichloropropane	78-87-5	248	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	38427	0	0.00	---	-----	No
VOC	1,3,5-Trimethylbenzene	108-67-8	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	114340	0	0.00	---	-----	No
VOC	1,3-Dichlorobenzene	541-73-1	313	0	0.00	3600	U	ug/kg	Yes	---	---	---	---	3332609	0	0.00	---	-----	No
VOC	1,4-Dichlorobenzene	106-46-7	264	0	0.00	2700	U	ug/kg	Yes	---	---	---	---	91315	0	0.00	---	-----	No
VOC	1,4-Dioxane	123-91-1	1	0	0.00	500	U	ug/kg	Yes	---	---	---	---	378030	0	0.00	---	-----	No
VOC	2-Butanone	78-93-3	246	37	15.04	380		ug/kg	Yes	---	---	---	---	46373332	0	0.00	---	-----	No
VOC	2-Chlorotoluene	95-49-8	49	0	0.00	23	U	ug/kg	Yes	---	---	---	---	2221740	0	0.00	---	-----	No
VOC	2-Methyl-1-propanol	78-83-1	1	0	0.00	100	U	ug/kg	Yes	---	---	---	---	33326087	0	0.00	---	-----	No
VOC	4-Methyl-2-pentanone	108-10-1	247	2	0.81	6	J	ug/kg	Yes	---	---	---	---	83210223	0	0.00	---	-----	No
VOC	Acetone	67-64-1	250	51	20.40	890	B	ug/kg	Yes	---	---	---	---	99978261	0	0.00	---	-----	No
VOC	Benzene	71-43-2	247	1	0.40	3	J	ug/kg	Yes	---	---	---	---	23563	0	0.00	---	-----	No
VOC	Bromodichloromethane	75-27-4	248	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	67070	0	0.00	---	-----	No
VOC	Bromoform	75-25-2	248	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	419858	0	0.00	---	-----	No
VOC	Bromomethane	74-83-9	248	6	2.42	5	JB	ug/kg	Yes	---	---	---	---	20959	0	0.00	---	-----	No
VOC	Carbon Disulfide	75-15-0	249	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	1637032	0	0.00	---	-----	No
VOC	Carbon Tetrachloride	56-23-5	248	2	0.81	440	J,B	ug/kg	Yes	---	---	---	---	8446	0	0.00	---	-----	No
VOC	Chlorobenzene	108-90-7	246	0	0.00	1600	U	ug/kg	Yes	---	---	---	---	666523	0	0.00	---	-----	No
VOC	Chloroethane	75-00-3	248	0	0.00	3100	U	ug/kg	Yes	---	---	---	---	1433909	0	0.00	---	-----	No
VOC	Chloroform	67-66-3	249	5	2.01	2	BJ	ug/kg	Yes	---	---	---	---	7850	0	0.00	---	-----	No
VOC	Chloromethane	74-87-3	244	0	0.00	3100	U	ug/kg	Yes	---	---	---	---	115077	0	0.00	---	-----	No

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	Is Constituent an AOI ?
VOC	cis-1,2-Dichloroethene	156-59-2	49	1	2.04	48		ug/kg	Yes	-----	-----	-----	---	1110870	0	0.00	---	-----	No
VOC	cis-1,3-Dichloropropene	10061-01-5	248	0	0.00	1600	U	ug/kg	Yes	-----	-----	-----	---	19432	0	0.00	---	-----	No
VOC	Dibromochloromethane	124-48-1	248	0	0.00	1600	U	ug/kg	Yes	-----	-----	-----	---	49504	0	0.00	---	-----	No
VOC	Dichlorodifluoromethane	75-71-8	49	0	0.00	23	U	ug/kg	Yes	-----	-----	-----	---	229820	0	0.00	---	-----	No
VOC	Ether	60-29-7	1	0	0.00	10	U	ug/kg	Yes	-----	-----	-----	---	22217391	0	0.00	---	-----	No
VOC	ethyl acetate	141-78-6	1	0	0.00	10	U	ug/kg	Yes	-----	-----	-----	---	99978261	0	0.00	---	-----	No
VOC	Ethylbenzene	100-41-4	247	2	0.81	9		ug/kg	Yes	-----	-----	-----	---	5385973	0	0.00	---	-----	No
VOC	Hexachloroethane	67-72-1	292	0	0.00	3600	U	ug/kg	Yes	-----	-----	-----	---	111087	0	0.00	---	-----	No
VOC	Isopropylbenzene	98-82-8	49	0	0.00	23	U	ug/kg	Yes	-----	-----	-----	---	32680	0	0.00	---	-----	No
VOC	Methylene Chloride	75-09-2	255	55	21.57	420	J	ug/kg	Yes	-----	-----	-----	---	271792	0	0.00	---	-----	No
VOC	Styrene	100-42-5	247	0	0.00	1600	U	ug/kg	Yes	-----	-----	-----	---	13789257	0	0.00	---	-----	No
VOC	Tetrachloroethene	127-18-4	247	7	2.83	38		ug/kg	Yes	-----	-----	-----	---	6705	0	0.00	---	-----	No
VOC	Toluene	108-88-3	250	60	24.00	860	J	ug/kg	Yes	-----	-----	-----	---	3094217	0	0.00	---	-----	No
VOC	trans-1,2-Dichloroethene	156-60-5	49	1	2.04	2	J	ug/kg	Yes	-----	-----	-----	---	287340	0	0.00	---	-----	No
VOC	trans-1,3-Dichloropropene	10061-02-6	248	0	0.00	1600	U	ug/kg	Yes	-----	-----	-----	---	20820	0	0.00	---	-----	No
VOC	Trichloroethene	79-01-6	248	6	2.42	48		ug/kg	Yes	-----	-----	-----	---	1770	0	0.00	---	-----	No
VOC	Trichlorofluoromethane	75-69-4	49	13	26.53	5	J	ug/kg	Yes	-----	-----	-----	---	1511019	0	0.00	---	-----	No
VOC	Vinyl Acetate	108-05-4	148	0	0.00	38	U	ug/kg	Yes	-----	-----	-----	---	2647023	0	0.00	---	-----	No
VOC	Vinyl Chloride	75-01-4	249	1	0.40	16.8		ug/kg	Yes	-----	-----	-----	---	2169	0	0.00	---	-----	No
VOC	Xylene, total	1330-20-7	247	5	2.02	68		ug/kg	Yes	-----	-----	-----	---	1059049	0	0.00	---	-----	No
WQP	Cyanide	57-12-5	7	1	14.29	230	B	ug/kg	Yes	-----	-----	-----	---	2221739	0	0.00	---	-----	No
WQP	Fluoride	16984-48-8	42	22	52.38	20300		ug/kg	Yes	-----	-----	-----	---	6665217	0	0.00	---	-----	No
WQP	Nitrate (as N)	ConID 184	69	25	36.23	89310	H	ug/kg	Yes	38445	1	1.45	Yes	177739130	0	0.00	---	-----	No
WQP	Nitrate/Nitrite (as N)	ConID 184	124	81	65.32	76000		ug/kg	Yes	38445	4	3.23	Yes	177739130	0	0.00	---	-----	No
WQP	Nitrite (as N)	ConID 187	36	1	2.78	5610	H	ug/kg	Yes	403	1	2.78	Yes	11108696	0	0.00	---	-----	No
RAD	Uranium-238	7440-61-1	423	423	100.00	59		pCi/g	Yes	3.38	23	5.44	Yes	29	1	0.24	Yes	-----	Yes
METAL	Thallium	7440-28-0	376	60	15.96	10000		ug/kg	Yes	821	16	4.26	Yes	7776	1	0.27	Yes	-----	Yes
METAL	Silver	7440-22-4	371	64	17.25	3100000		ug/kg	Yes	2045	23	6.20	Yes	555435	1	0.27	Yes	-----	Yes
METAL	Antimony	7440-36-0	355	52	14.65	51300		ug/kg	Yes	10057	17	4.79	Yes	44435	1	0.28	Yes	-----	Yes
PCB	PCB-1260	11096-82-5	311	7	2.25	2000	P	ug/kg	Yes	-----	-----	-----	---	1349	1	0.32	Yes	Eliminated	No

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Table 5.6
Sediment AOI Screening

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminatedor Retained By Process Knowledge ?	Is Constituent an AOI ?
SVOC	Dibenz(a,h)anthracene	53-70-3	289	22	7.61	530	J	ug/kg	Yes	----	----	----	---	379	1	0.35	Yes	-----	Yes
PCB	PCB-1254	11097-69-1	317	72	22.71	5200		ug/kg	Yes	----	----	----	---	1349	3	0.95	Yes	Eliminated	No
RAD	Americium-241	86954-36-1	461	339	73.54	56.5		pCi/g	Yes	0.04	238	51.63	Yes	7.69	6	1.30	Yes	-----	Yes
METAL	Iron	7439-89-6	386	386	100.00	55000000		ug/kg	Yes	23217259	29	7.51	Yes	33326087	7	1.81	Yes	Eliminated	No
RAD	Radium-226	13982-63-3	113	112	99.12	3.08		pCi/g	Yes	1.72	13	11.50	Yes	2.69	3	2.65	Yes	Eliminated	No
RAD	Plutonium-239/240		481	400	83.16	217		pCi/g	Yes	0.05	308	64.03	Yes	10	16	3.33	Yes	-----	Yes
METAL	Chromium	7440-47-3	386	372	96.37	140000		ug/kg	Yes	24518	39	10.10	Yes	28418	16	4.15	Yes	-----	Yes
METAL	Aluminum	7429-90-5	386	386	100.00	49000000		ug/kg	Yes	17996187	66	17.10	Yes	24774076	22	5.70	Yes	Eliminated	No
SVOC	Benzo(a)pyrene	50-32-8	290	106	36.55	1300		ug/kg	Yes	----	----	----	---	379	28	9.66	Yes	----	Yes
METAL	Manganese	7439-96-5	386	386	100.00	2500000		ug/kg	Yes	669130	15	3.89	Yes	419000	50	12.95	Yes	Eliminated	No
RAD	Cesium-134	13967-70-9	137	75	54.74	0.26		pCi/g	Yes	0.25	1	0.73	Yes	0.08	25	18.25	Yes	Eliminated	No
RAD	Cesium-137	10045-97-3	226	172	76.11	1.498		pCi/g	Yes	0.96	3	1.33	Yes	0.22	62	27.43	Yes	Eliminated	No
METAL	Arsenic	7440-38-2	385	374	97.14	27900		ug/kg	Yes	6263	98	25.45	Yes	2409	313	81.30	Yes	-----	Yes
RAD	Radium-228	15262-20-1	95	94	98.95	4.1		pCi/g	Yes	3.80	1	1.05	Yes	0.11	93	97.89	Yes	Eliminated	No

---- Not Applicable

The frequency of detection of the analyte concentration above the PRG is greater than (>) 0 % and less than (<) 1 %.

The frequency of detection of the analyte concentration above the PRG is greater than (>) or equal to 1 % and less than (<) 5 %.

The frequency of detection of the analyte concentration above the PRG is greater than (>) 5 %.

Note: The results presented in this table are ordered by increasing frequency of detection above the WRW PRG.

Table 5.7
Sediment AOIs Eliminated or Retained By Process Knowledge

Analyte	Basis for Eliminating or Retaining a Constituent as a Sediment AOI
PCB-1254 PCB-1260	Only one occurrence of PCB-1254 and PCB-1260 were found above the PRG and occurs at the outfall of the drainage pipe from Building 991. This area has been remediated and the sediments removed, thus eliminating the only occurrence of PCBs above the PRG.
Aluminum	Aluminum was not retained as a sediment AOI because it is a ubiquitous, naturally-occurring constituent of the particulates that comprise the sediments. Aluminum and aluminum chemicals were used at the site in various metallurgical operations, however, aluminum was not carried forward as a material of concern for the ChemRisk process (DOE 2005).
Iron	Iron was not retained as a sediment AOI because it is a ubiquitous, naturally-occurring constituent of the particulates that comprise the sediments. Iron commonly occurs as a chemical component of the particulate, suspended ferric oxyhydroxides, and as coatings on particulates. Based on results of different exposure scenarios, iron was not carried forward as a material of concern for the ChemRisk process (DOE 2005).
Manganese	Manganese was not retained as a sediment AOI because it is a ubiquitous, naturally-occurring constituent of the particulates that comprise the sediments. Manganese was not identified or discussed in building process information (CDH, 1992; DOE, 2004d). Manganese has not been found associated with UBC sites (DOE 2004d). Only small quantities were identified to be in inventory with the exception of manganous sulfate which had an inventory in 1974 of 2560 kilograms and then later in 1988 of 0.06 kilograms (the specific use was not clear in the ChemRisk reports). Based on results of different exposure scenarios, manganese was not carried forward as a material of concern for the ChemRisk process (DOE 2005).
Cesium-134	A review of possible contaminants of concern at RFETS identified cesium-134 as a radionuclide used for research, analytical, and calibration activities (for example, sealed and plated sources) (DOE 2005c). Based on limited quantities, cesium-134 release to the environment was estimated to be minimal or there would be no release. The detection of cesium-134 (along with other radionuclides) in environmental samples from 1970 through 1981 was consistent with the presence of fission products from worldwide fallout and the levels were typical of other sites sampled in the western United States. The Background Soils Characterization Program conducted in the early 1990's stated that cesium-134, cesium-137 and strontium-89+90 were not windborne contaminants from RFETS (DOE 1995). Cesium-134 has a half life of 2.06 years. Cesium-134 is distributed in regional soils as a result of fallout from nuclear-weapons explosions (DOE 1995).
Cesium-137	A review of possible contaminants of concern at RFETS identified cesium-137 as a radionuclide used for research, analytical, and calibration activities (for example, sealed and plated sources) (DOE 2005c). Based on limited quantities, cesium-137 release to the environment was estimated to be minimal or there would be no release. The detection of cesium-137 (along with other radionuclides) in environmental samples from 1970 through 1981 was consistent with the presence of fission products from worldwide fallout and the levels were typical of other sites sampled in the western United States. The Background Soils Characterization Program conducted in the early 1990's stated that cesium-134, cesium-137 and strontium-89+90 were not windborne contaminants from RFETS (DOE 1995). In addition, the Citizen's Environmental Sampling Committee (CESC) conducted an off-site soil sampling study in 1993 and 1994. Background levels of cesium-137 were detected in some soil samples; however, this report concluded that "no evidence has been found to suggest that cesium-137 or strontium-90 were released during the operational period of the Rocky Flats Plant (CESC 1996)." Cesium-137 has a half life of 30.0 years.

Table 5.7
Sediment AOIs Eliminated or Retained By Process Knowledge

Analyte	Basis for Eliminating or Retaining a Constituent as a Sediment AOI
	Cesium-137 is distributed in regional soils as a result of fallout from nuclear-weapons explosions (DOE 1995). In a September 2005 report summarizing the June 2005 aerial radiological survey of the site, the report concluded that the observed cesium-137 soil activity levels within the site were consistent with known worldwide fallout levels that have been measured throughout the United States and there was no indication that any of the cesium-137 deposition detected was due to past RFETS operations (DOE 2005e).
Radium-226	Radium-226 was not retained as a sediment AOI because of the limited use of radium at Rocky Flats and the limited areal extent of total radium at the site. Information presented in the ChemRisk Task 1 Report (CDH 1991) concerning radium indicates that Ra-226, a daughter of uranium-238 decay, was used in small quantities for research, analysis, and calibration (e.g., sealed and plated sources). In addition, the only Ra-226 waste generated at RFETS, based on WEMS and WSRIC, was as sealed sources. However, Ra-226 could be potentially derived from both natural uranium present in the region and uranium metal fabrication and processing conducted at the site. Because of the limited quantity of Ra-226 used and its waste form, it was not carried forward through the ChemRisk process (CDH 1991).
Radium-228	Radium-228 was not retained as a sediment AOI because of the limited use of thorium at Rocky Flats and the limited areal extent of total radium at the site. Ra-228 was not identified in the ChemRisk Task 1 Report as a radionuclide used at Rocky Flats (CDH 1991). Furthermore, no Ra-228 waste was reported to have been generated based on WEMS and WSRIC. However, thorium-232, the parent radionuclide for Ra-228, was used at RFETS to fabricate metal parts from thorium and thorium alloys in Building 881. Thorium and its compounds were also used in analytical procedures and other research and development programs in Building 771. It was concluded during the development of the ChemRisk reports that Th-232 was most likely released as airborne particulates and was not a significant component of airborne effluent (CDH 1991). Furthermore, Th-232 was not used in significant quantities relative to other production radionuclides, thus, a source term was not developed for Th-232 during the ChemRisk evaluation.

Table 5.8
Sediment AOIs

Analyte Group	Analyte	Derived CAS	Number of Samples	Number of Detections	Frequency of Detection (%)	Maximum Concentration	Data Qualifier	Units	AOI Screen 1	AOI Screen 2				AOI Screen 3				AOI Screen 4	
									Is There a WRW PRG ?	Background M2SD	Number of Detections Above the Background M2SD	Frequency of Detection (%) Above the Background M2SD	Is the Maximum Concentration Above the Background M2SD ?	WRW PRG	Number of Detections Above the WRW PRG	Frequency of Detection (%) Above the WRW PRG	Is the Maximum Result Above the WRW PRG ?	Is Constituent Eliminated or Retained By Process Knowledge ?	Is Constituent an AOI ?
RAD	Uranium-238	7440-61-1	423	423	100.00	59		pCi/g	Yes	3.38	23	5.44	Yes	29	1	0.24	Yes	-----	Yes
METAL	Thallium	7440-28-0	376	60	15.96	10000		ug/kg	Yes	821	16	4.26	Yes	7776	1	0.27	Yes	-----	Yes
METAL	Silver	7440-22-4	371	64	17.25	3100000		ug/kg	Yes	2045	23	6.20	Yes	555435	1	0.27	Yes	-----	Yes
METAL	Antimony	7440-36-0	355	52	14.65	51300		ug/kg	Yes	10057	17	4.79	Yes	44435	1	0.28	Yes	-----	Yes
SVOC	Dibenz(a,h)anthracene	53-70-3	289	22	7.61	530	J	ug/kg	Yes	-----	-----	-----	---	379	1	0.35	Yes	-----	Yes
RAD	Americium-241	86954-36-1	461	339	73.54	56.5		pCi/g	Yes	0.04	238	51.63	Yes	7.7	6	1.30	Yes	-----	Yes
RAD	Plutonium-239/240		481	400	83.16	217		pCi/g	Yes	0.05	308	64.03	Yes	10	16	3.33	Yes	-----	Yes
METAL	Chromium	7440-47-3	386	372	96.37	140000		ug/kg	Yes	24518	39	10.10	Yes	28418	16	4.15	Yes	-----	Yes
SVOC	Benzo(a)pyrene	50-32-8	290	106	36.55	1300		ug/kg	Yes	-----	-----	-----	---	379	28	9.66	Yes	-----	Yes
METAL	Arsenic	7440-38-2	385	374	97.14	27900		ug/kg	Yes	6263	98	25.45	Yes	2409	313	81.30	Yes	-----	Yes

Notes:

----- Not Applicable

The frequency of detection of the analyte concentration above the PRG is greater than (>) 0 % and less than (<) 1 %.

The frequency of detection of the analyte concentration above the PRG is greater than (>) or equal to 1 % and less than (<) 5 %.

The frequency of detection of the analyte concentration above the PRG is greater than (>) 5 %.

Table 5.9
Summary of the Sediment AOIs By Drainage Basin

Drainage Basin	Sediment AOI
Walnut Creek, Woman Creek	Benzo(a)pyrene
Woman Creek	Dibenz(a,h)anthracene
Woman Creek	Antimony
Walnut Creek, Woman Creek, Rock Creek, Lower Smart Ditch	Arsenic
Walnut Creek, Woman Creek	Chromium
Walnut Creek	Silver
Woman Creek	Thallium
Walnut Creek	Americium-241
Walnut Creek, Woman Creek	Plutonium-239/240
Walnut Creek	Uranium-238

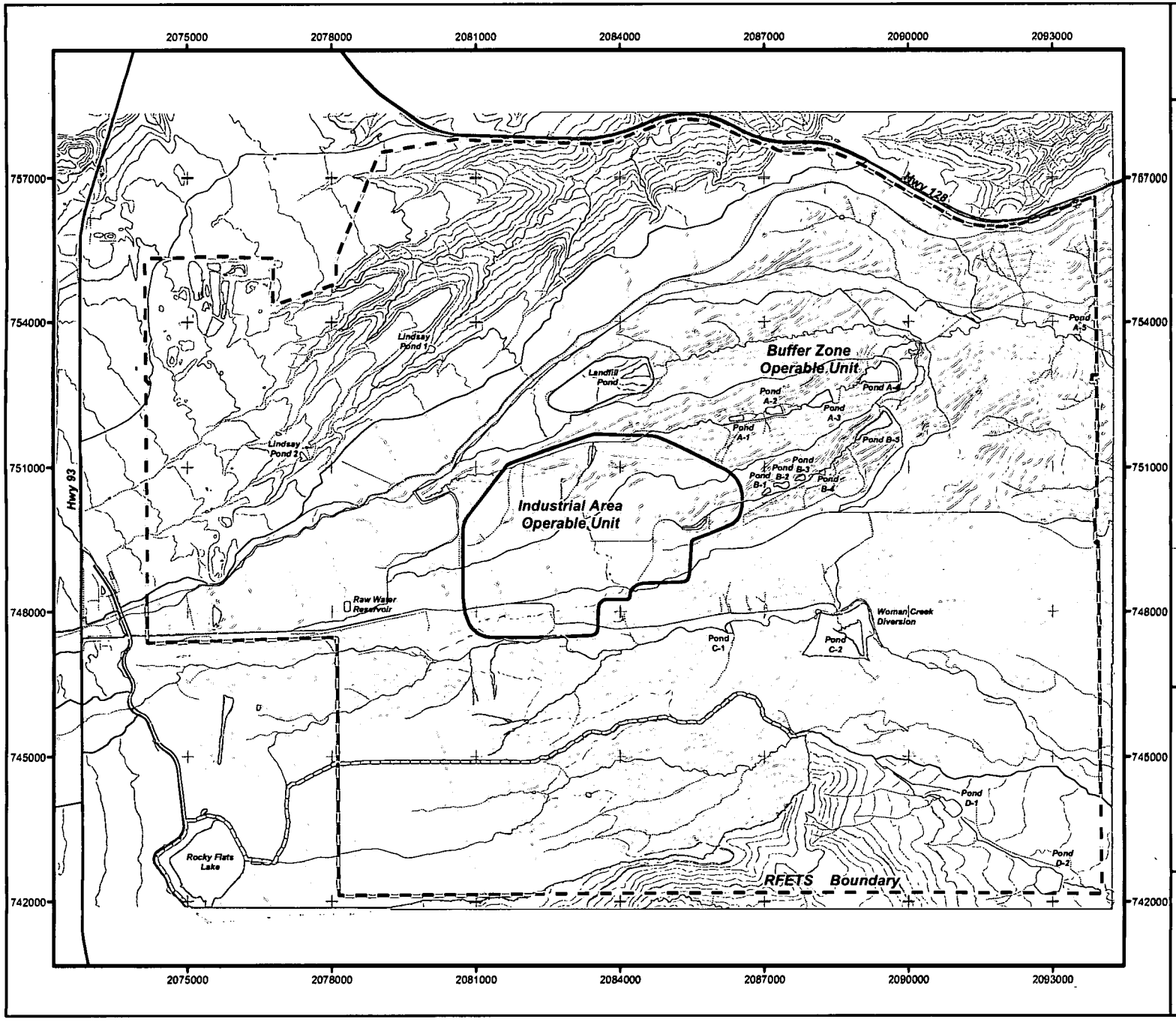

Figure 5.3

Surface Water Drainage Basins

Key

- Rock Creek drainage basin
- Walnut Creek drainage basin
- Woman Creek drainage basin
- Lower Smart Ditch drainage basin

Standard Map Features

- Pond
- Site boundary
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Topographic contour (20-foot)

N
W E
S

0 1,000 2,000 3,000 Feet

Scale 1:36,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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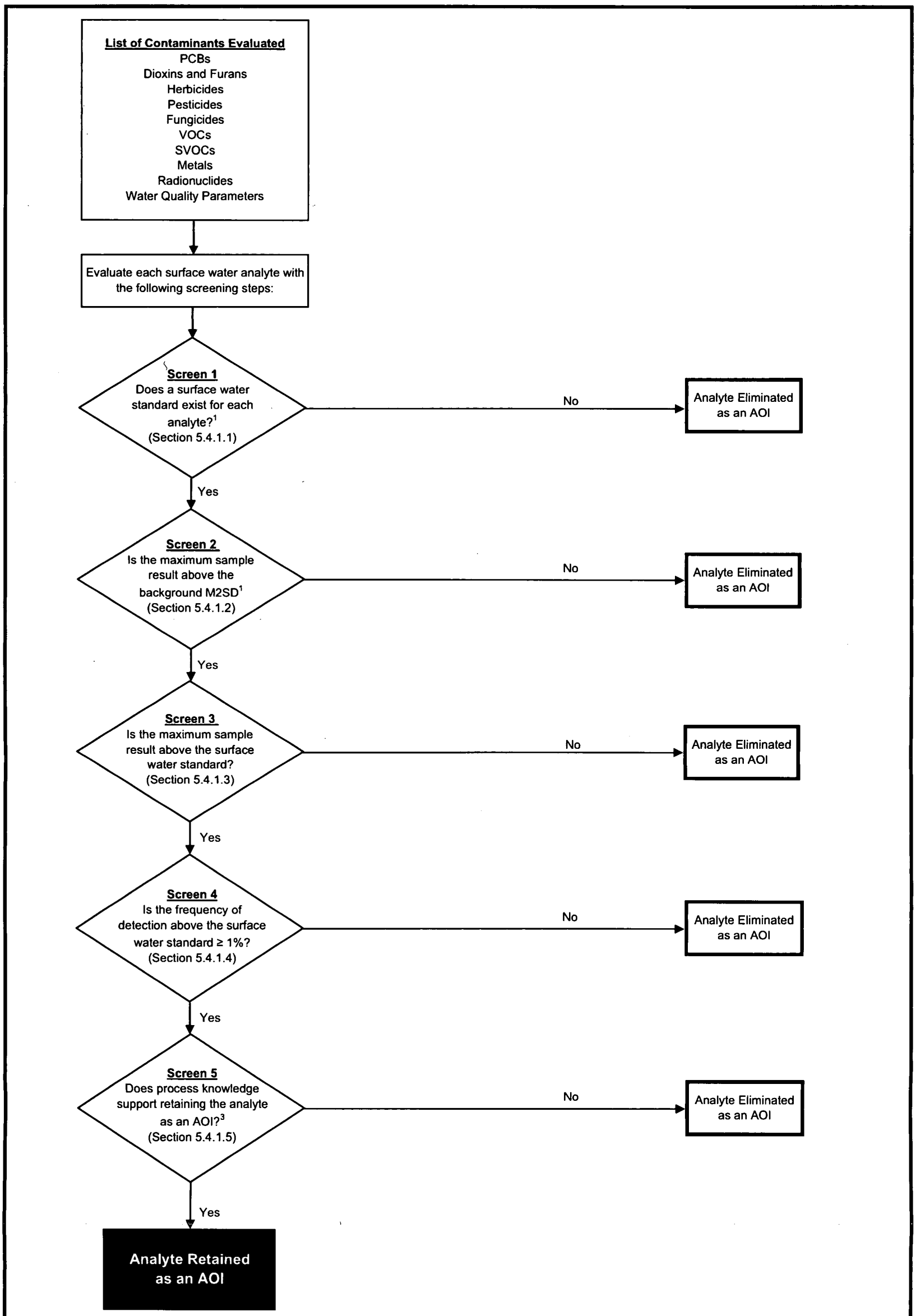
5-3 Surface Water Basins.mxd

Figure 5.4
Surface Water AOI Screening Process



Notes:

[1]If the practical quantitation limit (PQL) is higher than the surface water standard, the PQL is used as the comparison value.

[2]Background mean + two standard deviation values used to evaluate surface water nature and extent were developed as part of the Comprehensive Risk Assessment (DOE, 2005b). For constituents (organic compounds, some inorganic, and some radionuclides) that do not have background values, it was assumed that detection of these constituents above the analytical detection limit indicates their presence in the environment.

[3]DOE recognizes that process knowledge at RFETS is not perfectly known. However, process knowledge alone is not used to eliminate a constituent as an AOI. Other analyte criteria such as its areal distribution relative to RFETS activities, its proximity to contaminant sources, accelerated actions performed to remove contaminant source(s), and its natural occurrence and distribution in the environment are also considered when evaluating whether to retain or eliminate a constituent as an AOI.

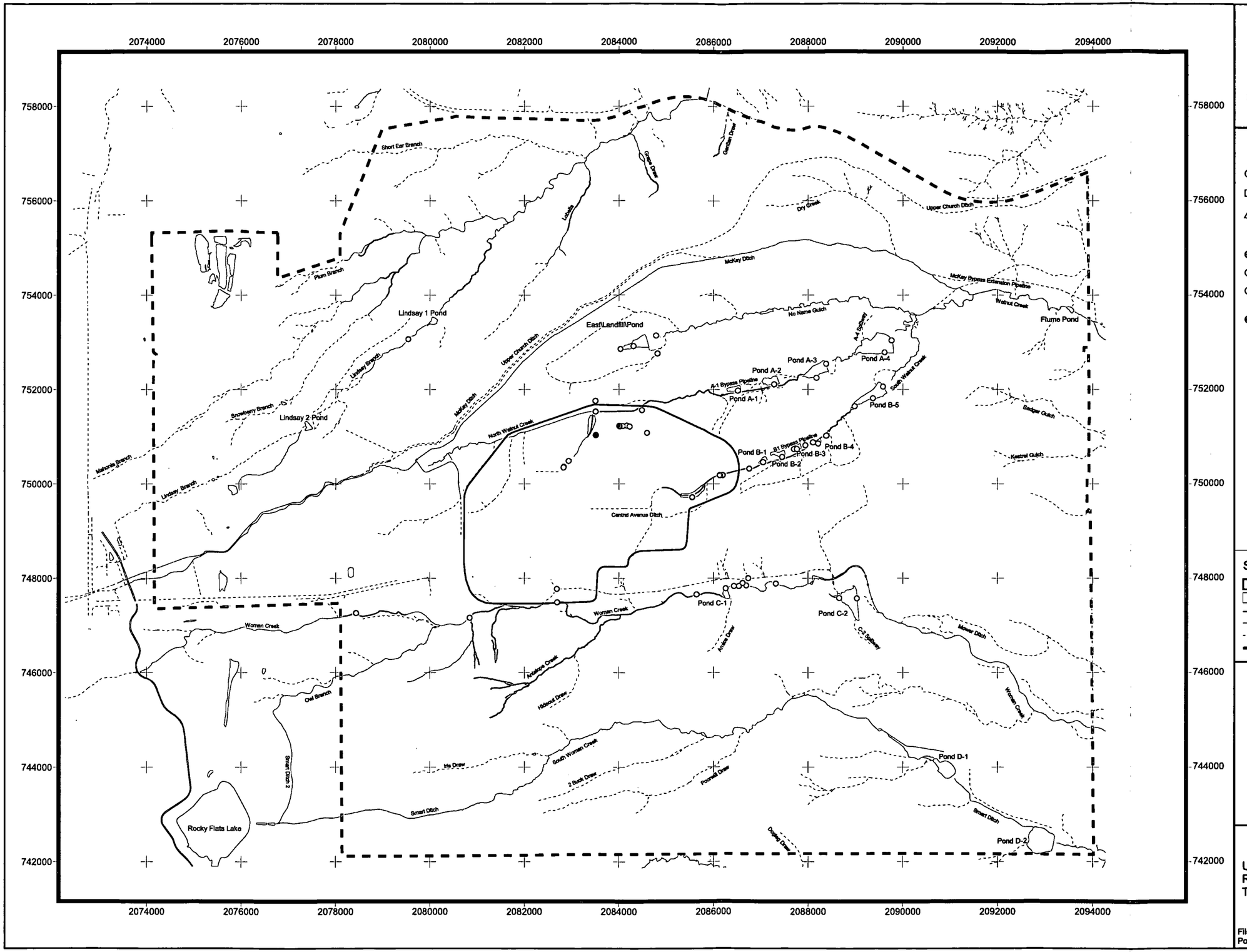


Figure 5.5

Carbon Tetrachloride Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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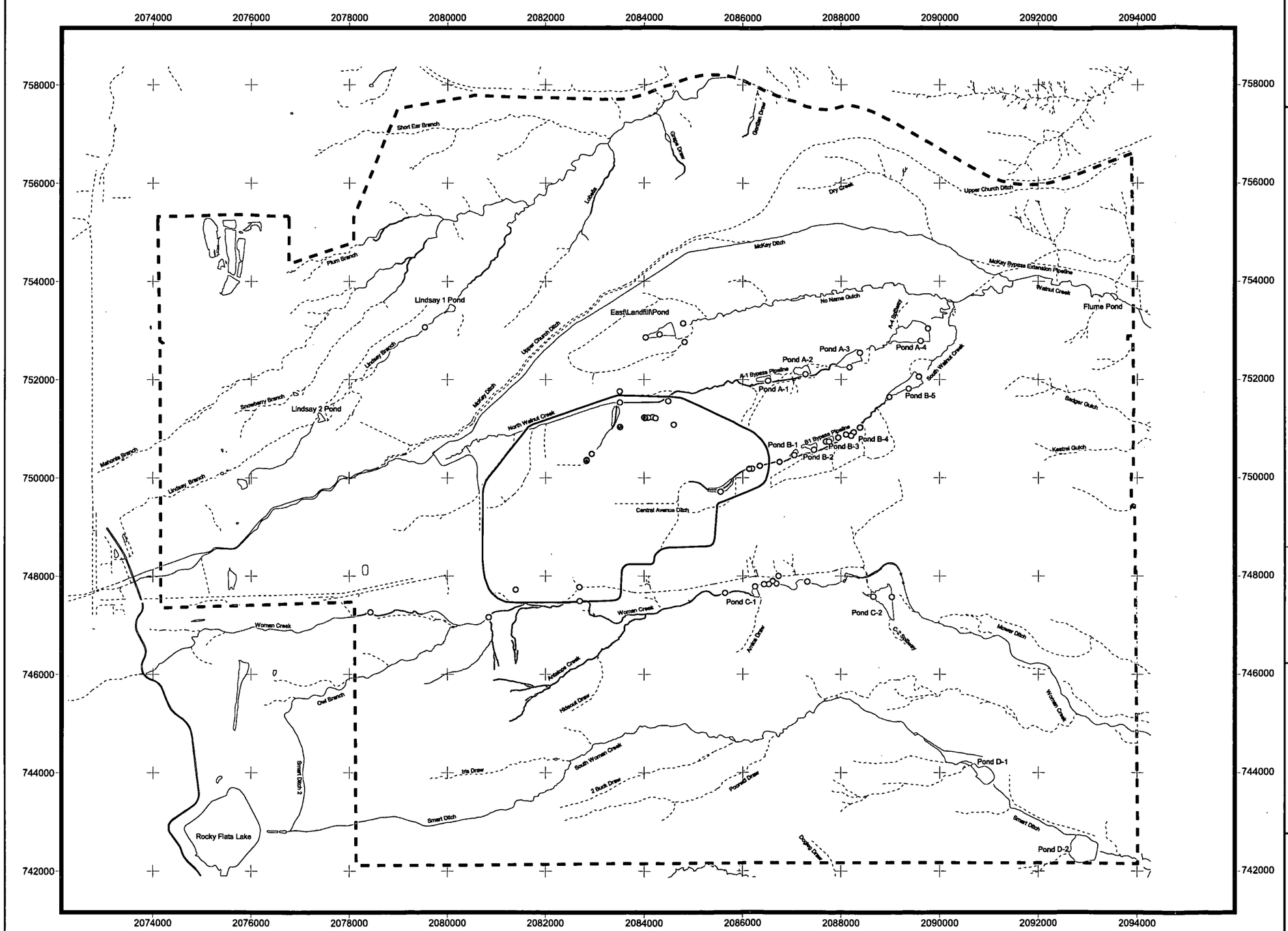
Figure 5.6

Chloroform Concentrations in Surface Water



Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental Technology Site

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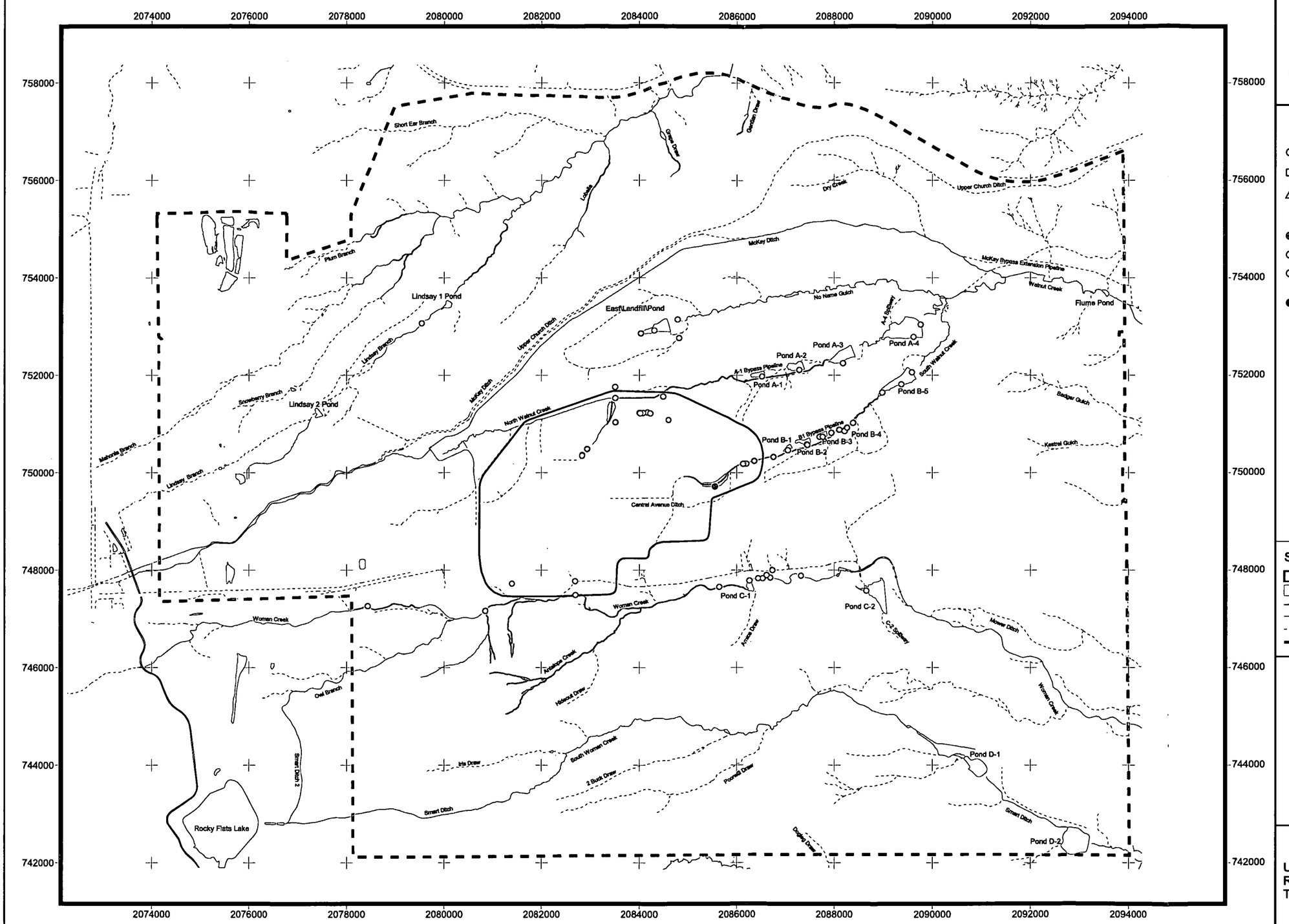
Figure 5.7

cis-1,2-Dichloroethene Concentrations in Surface Water



Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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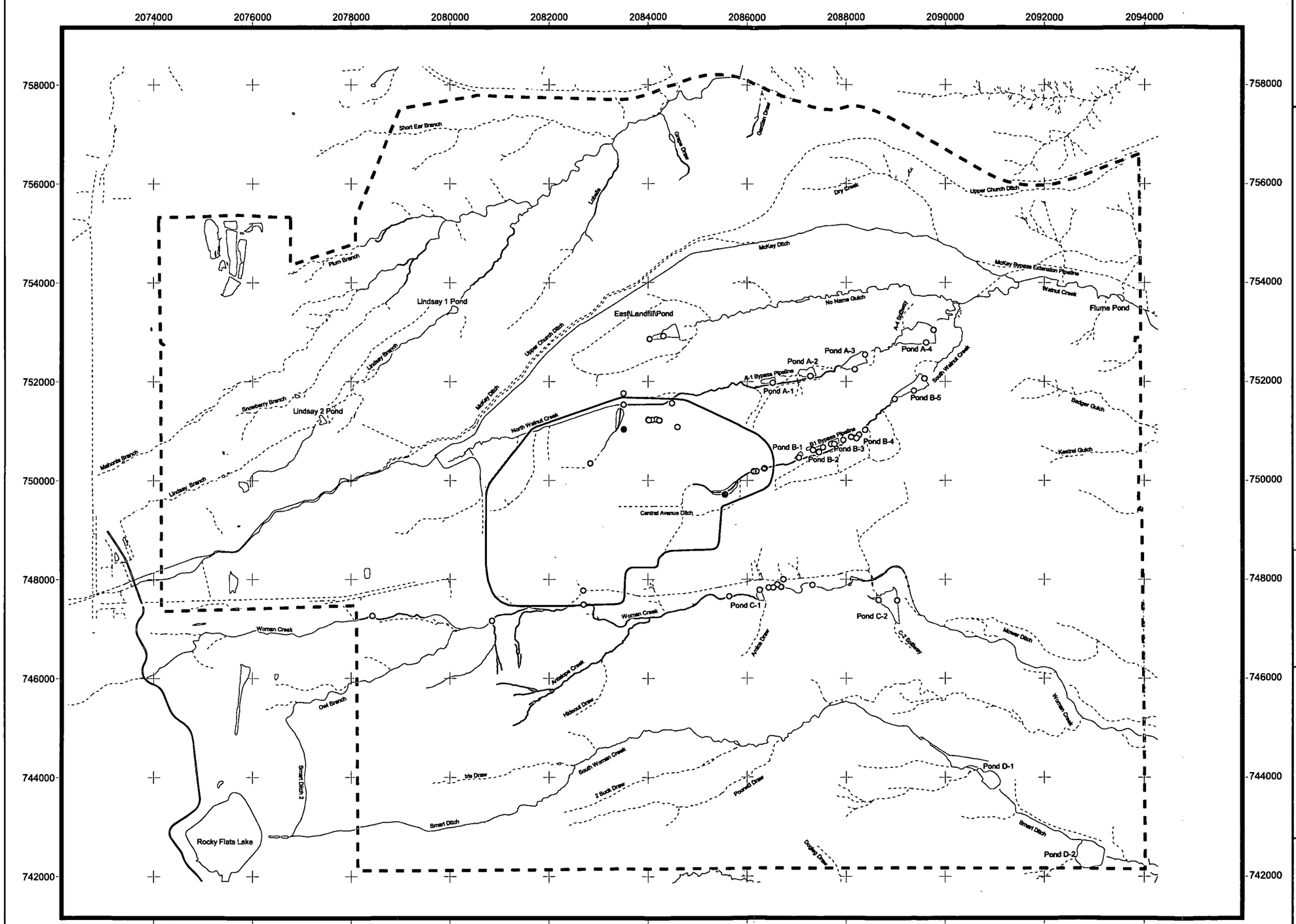
Figure 5.8

Methylene Chloride Concentrations in Surface Water



Key

- ○ Sample collected since January 1, 2000
- ▭ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ⊗ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N, W, E, S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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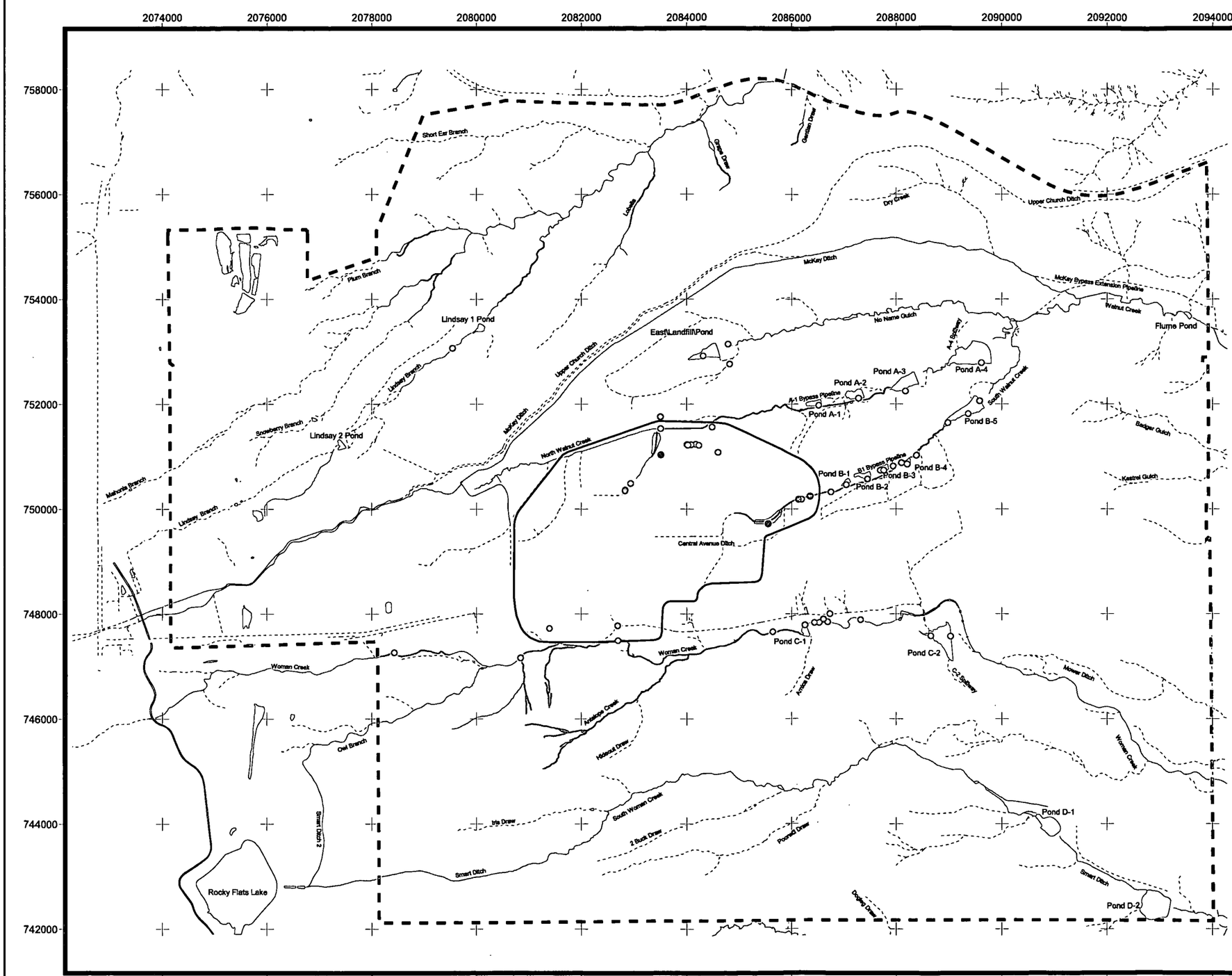

Figure 5.9

Tetrachloroethene Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

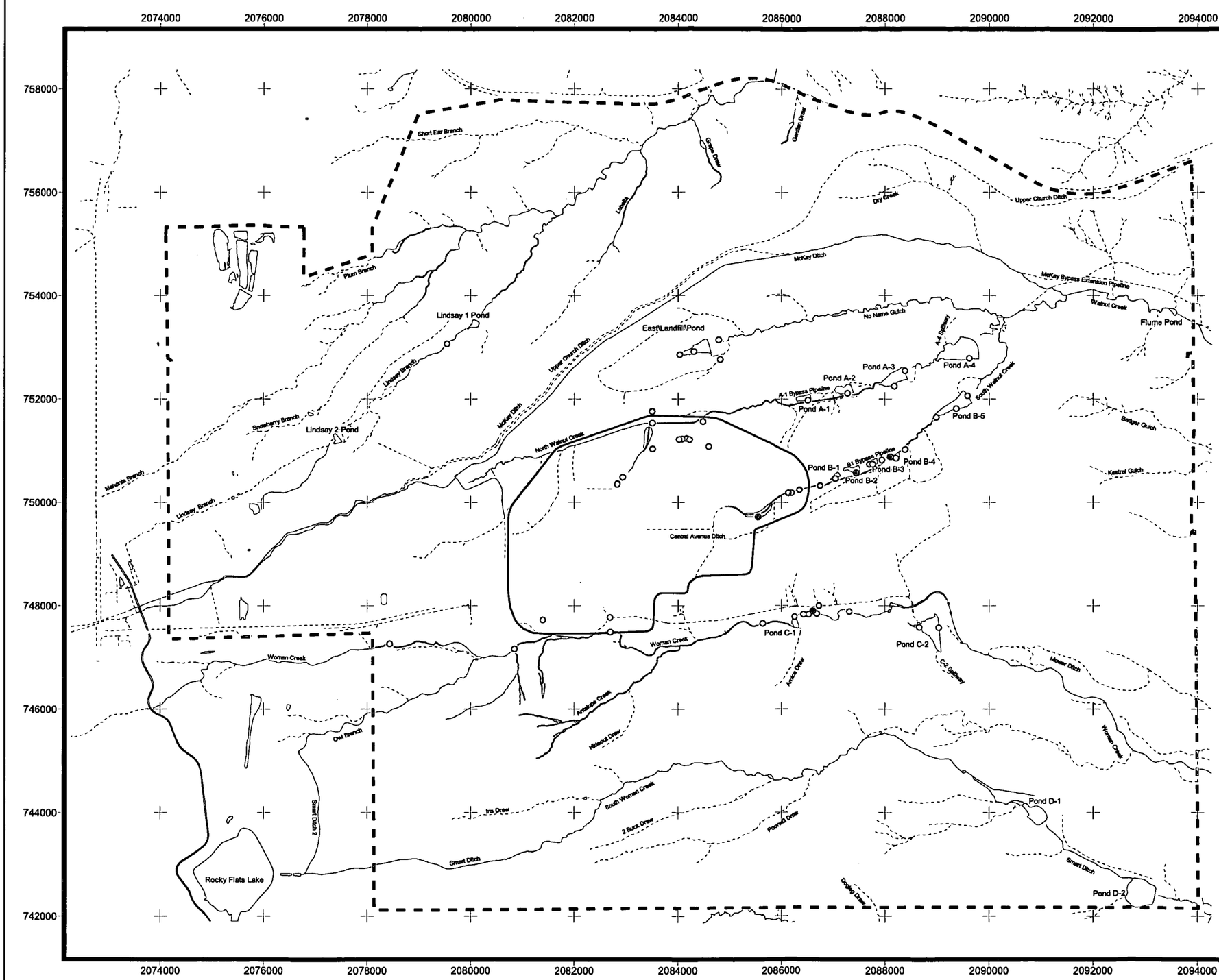

Figure 5.10

Trichloroethene Concentrations in Surface Water

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > Surface Water Standard
- Not applicable
- Detected and <= Surface Water Standard
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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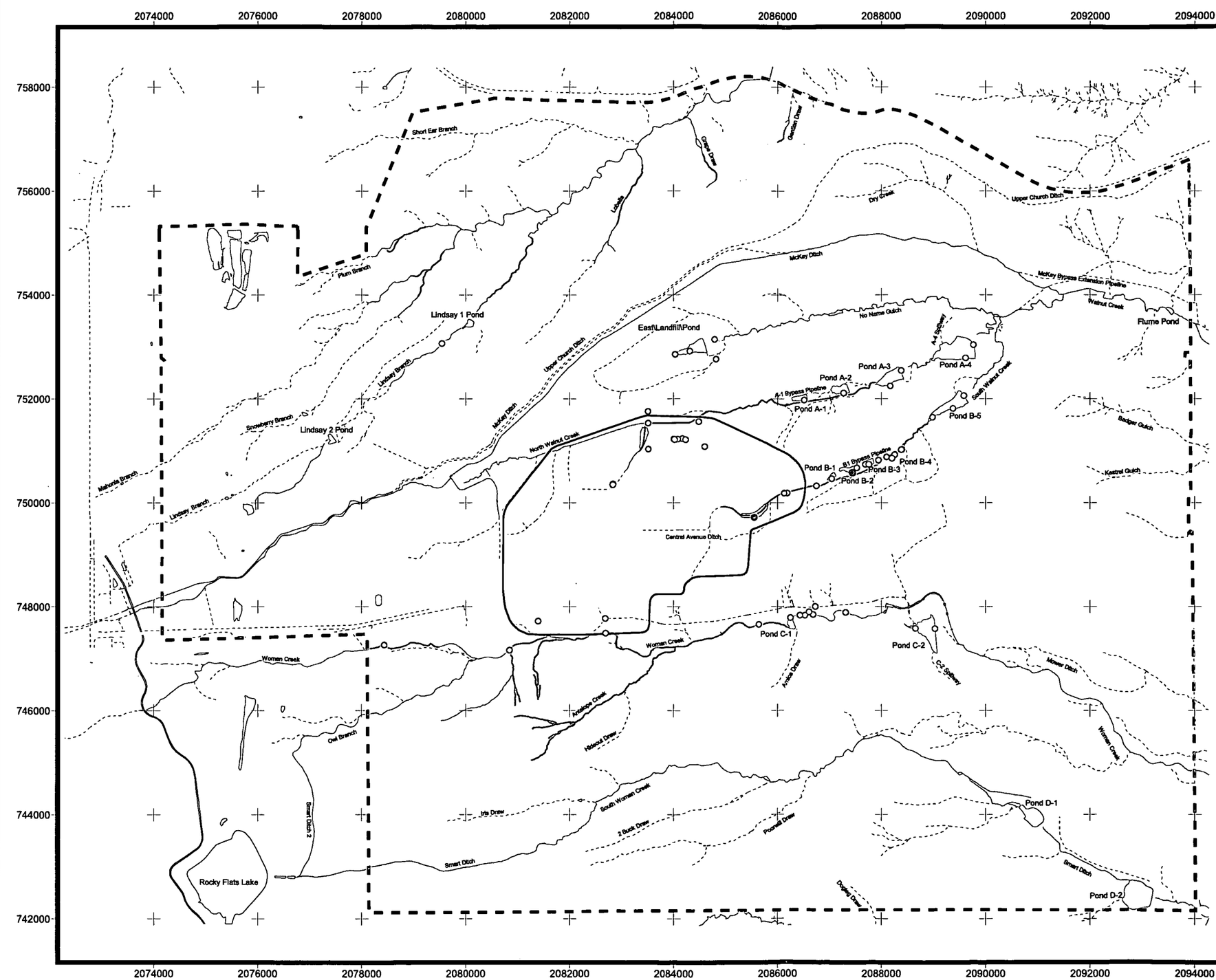

Figure 5.11

Vinyl Chloride Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ Not applicable
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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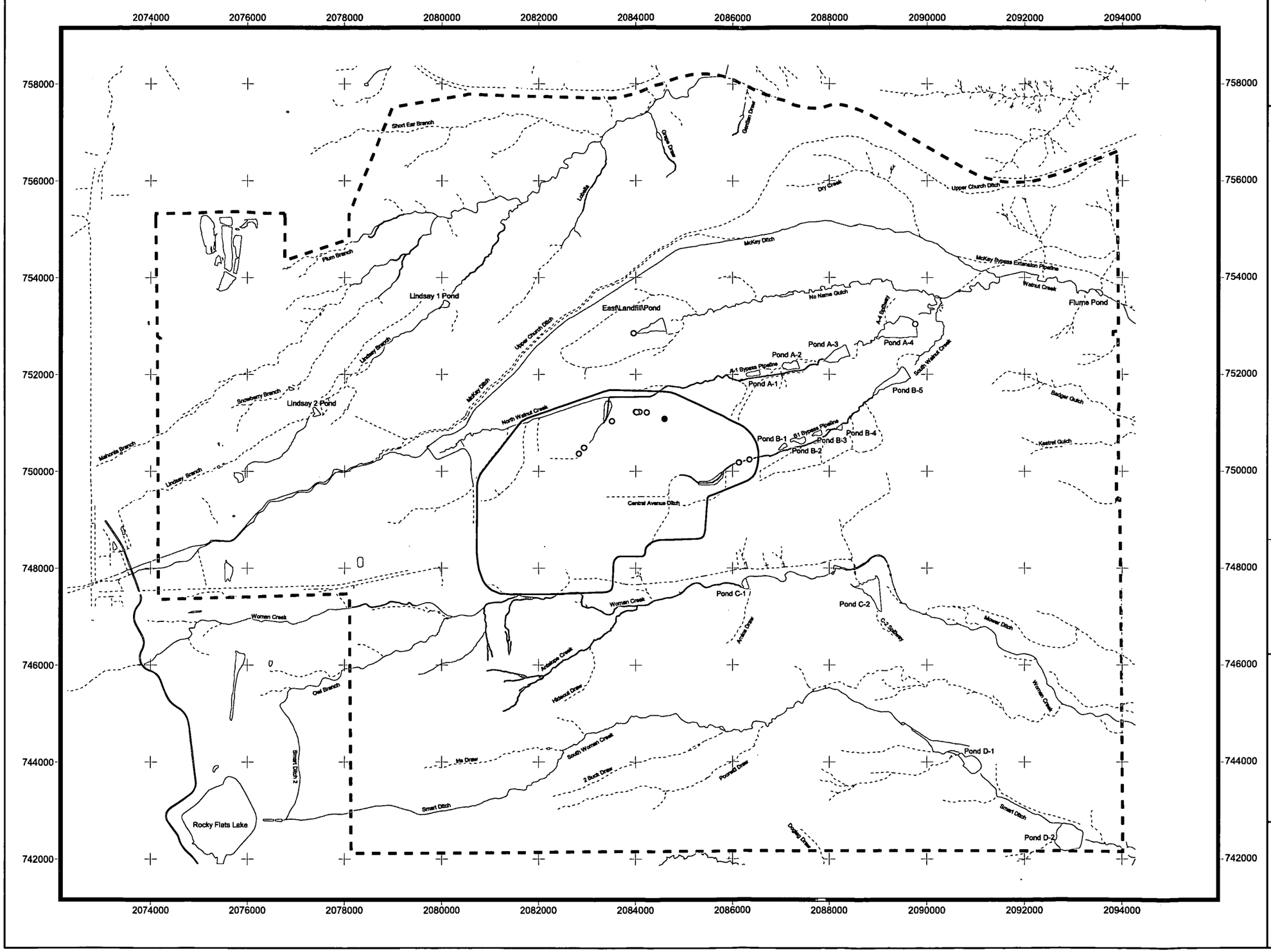

Figure 5.12

Dissolved Aluminum Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > M2SD
- ○ > Surface Water Standard and <= M2SD
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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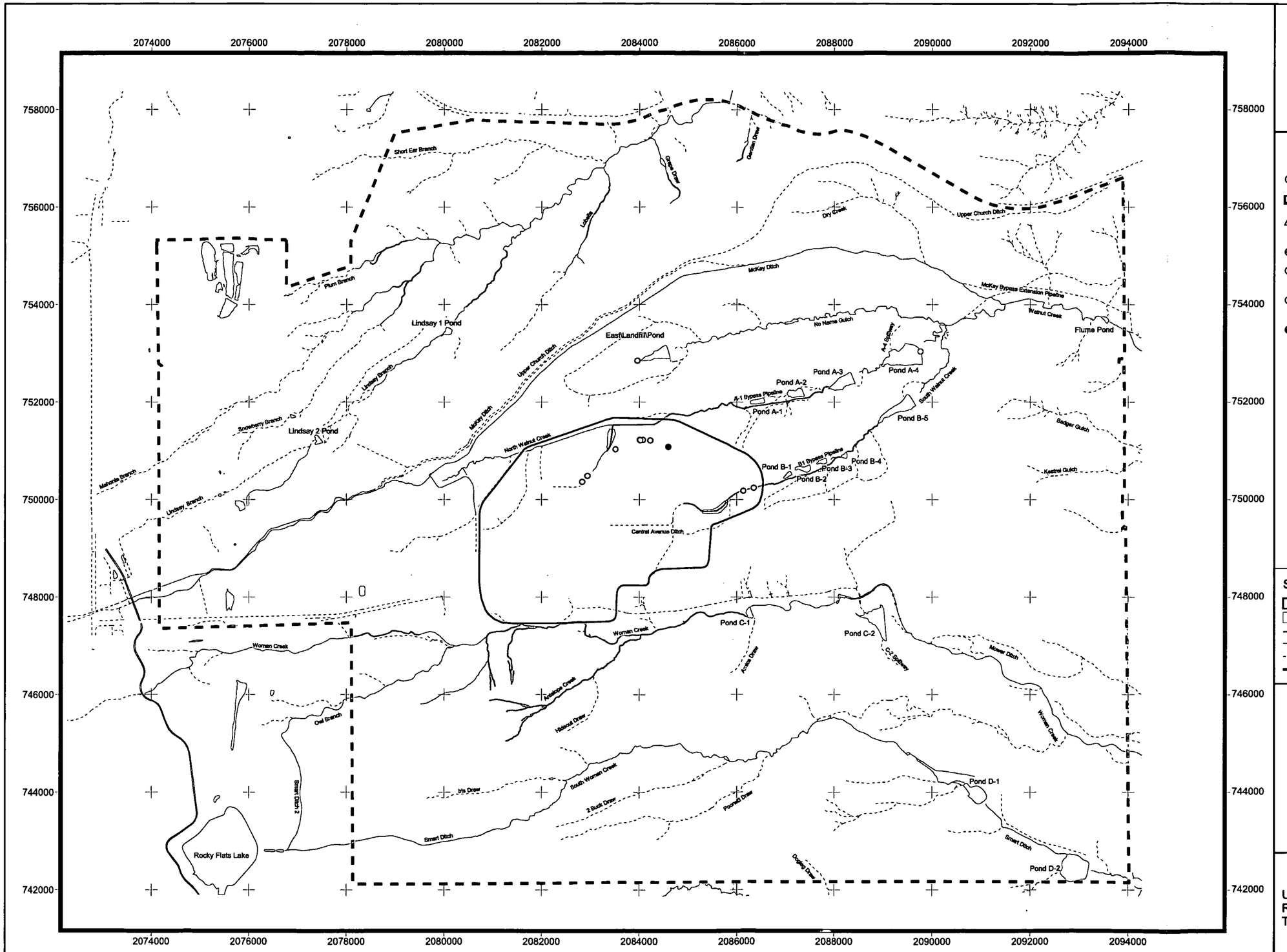

Figure 5.12

Dissolved Aluminum Concentrations in Surface Water

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > M2SD
- > Surface Water Standard and <= M2SD
- Detected and <= Surface Water Standard
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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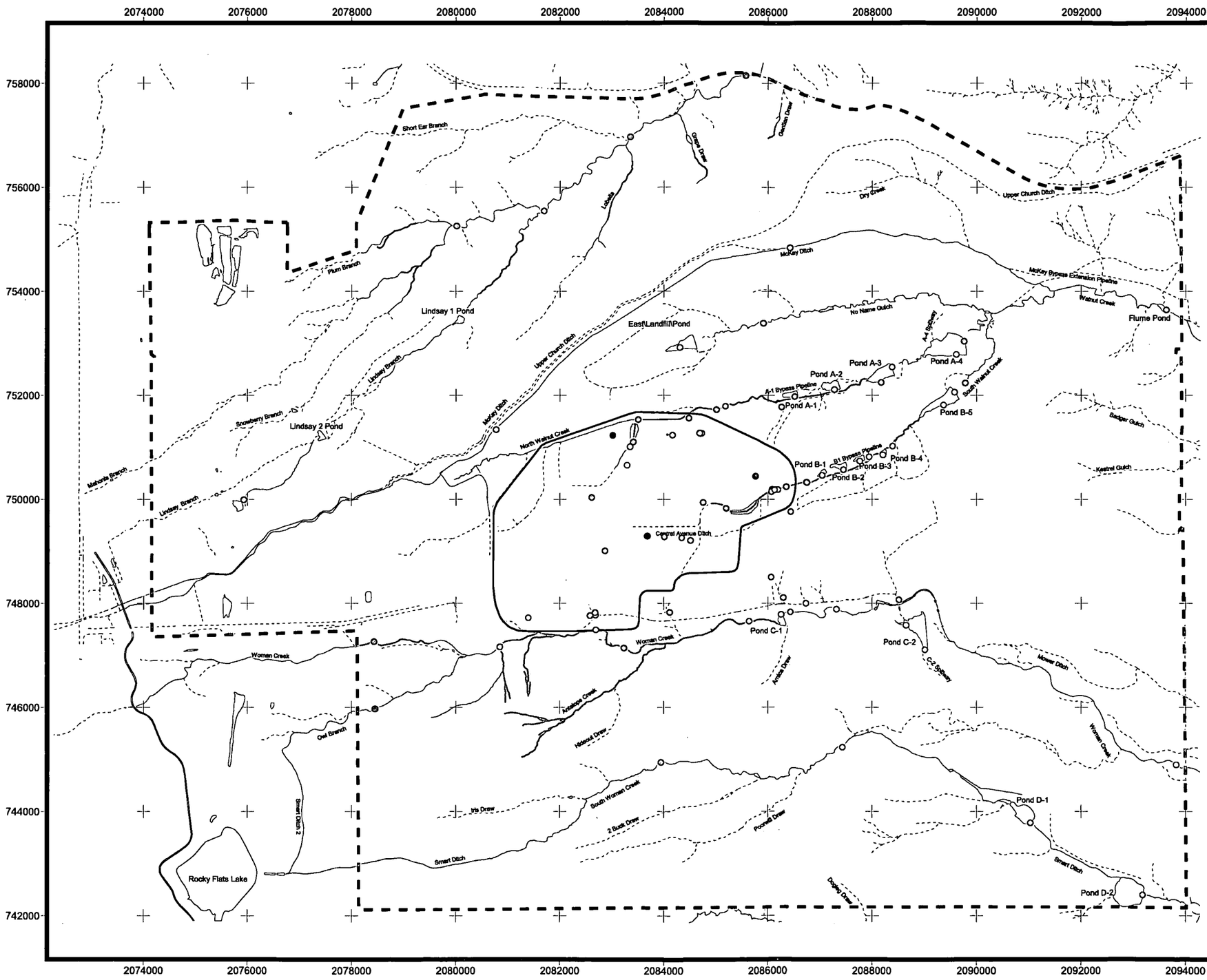

Figure 5.13

Total Beryllium Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

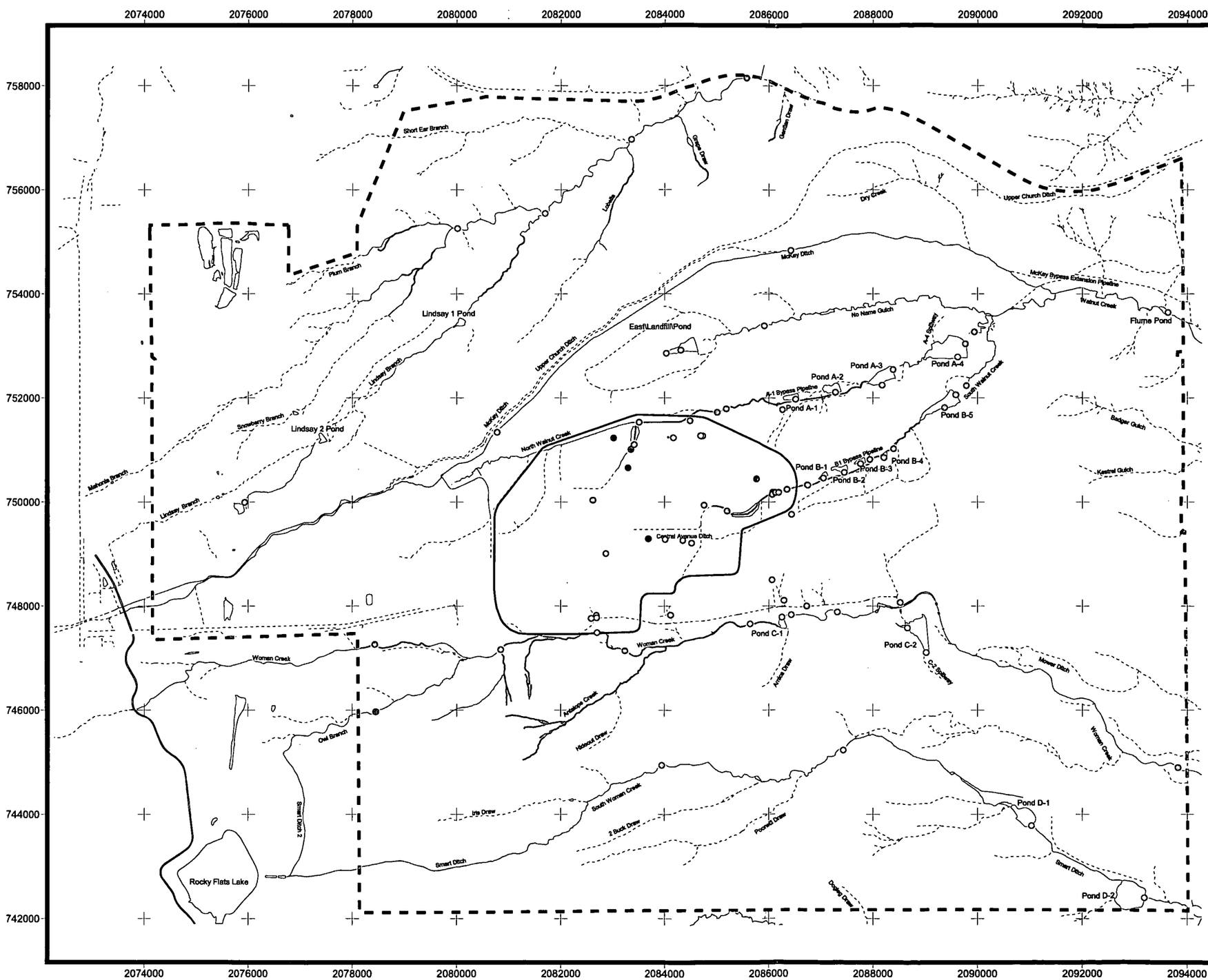

Figure 5.14

Total Chromium Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > M2SD
- ○ > Surface Water Standard and <= M2SD
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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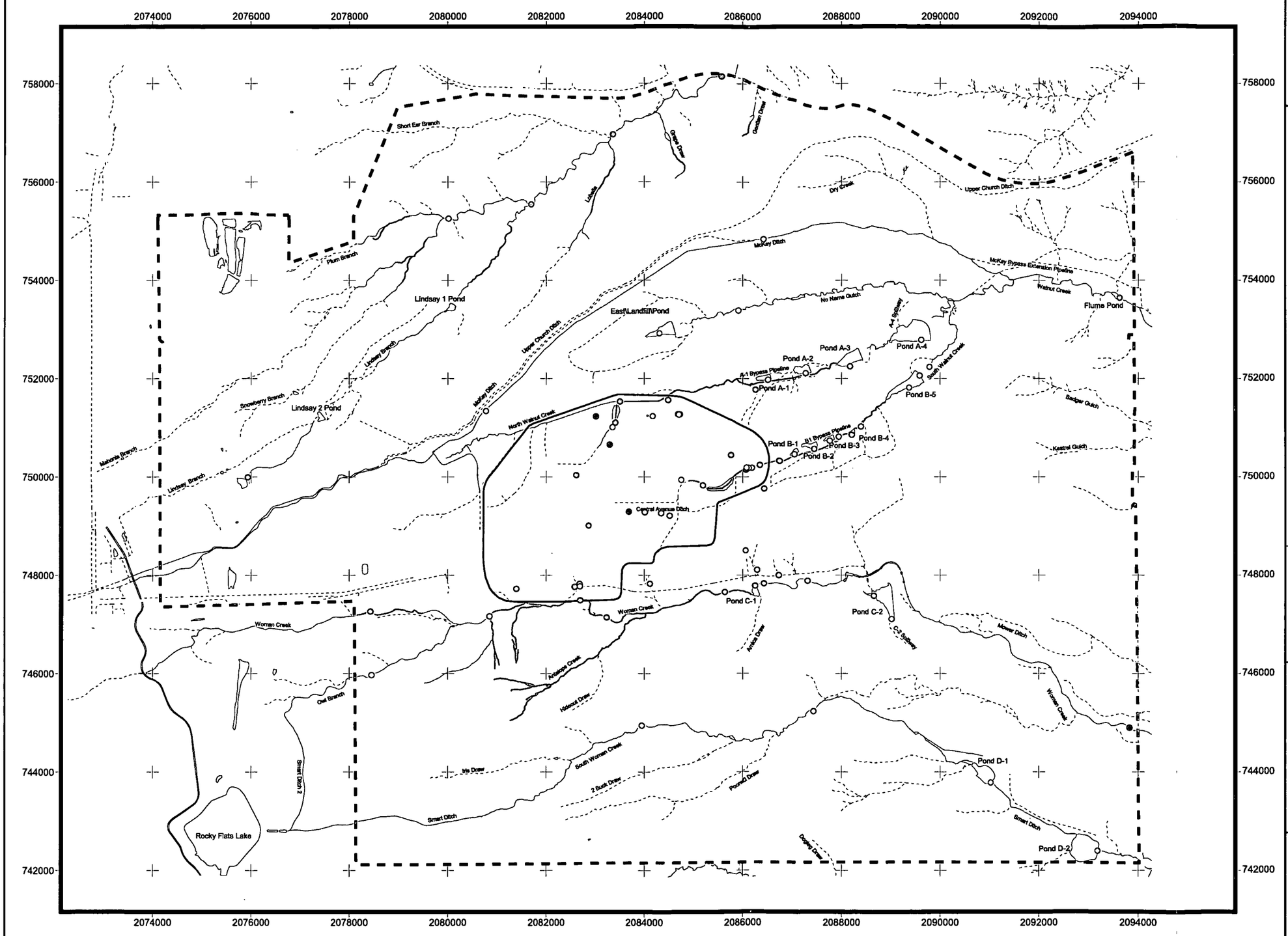

Figure 5.15

Total Lead Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

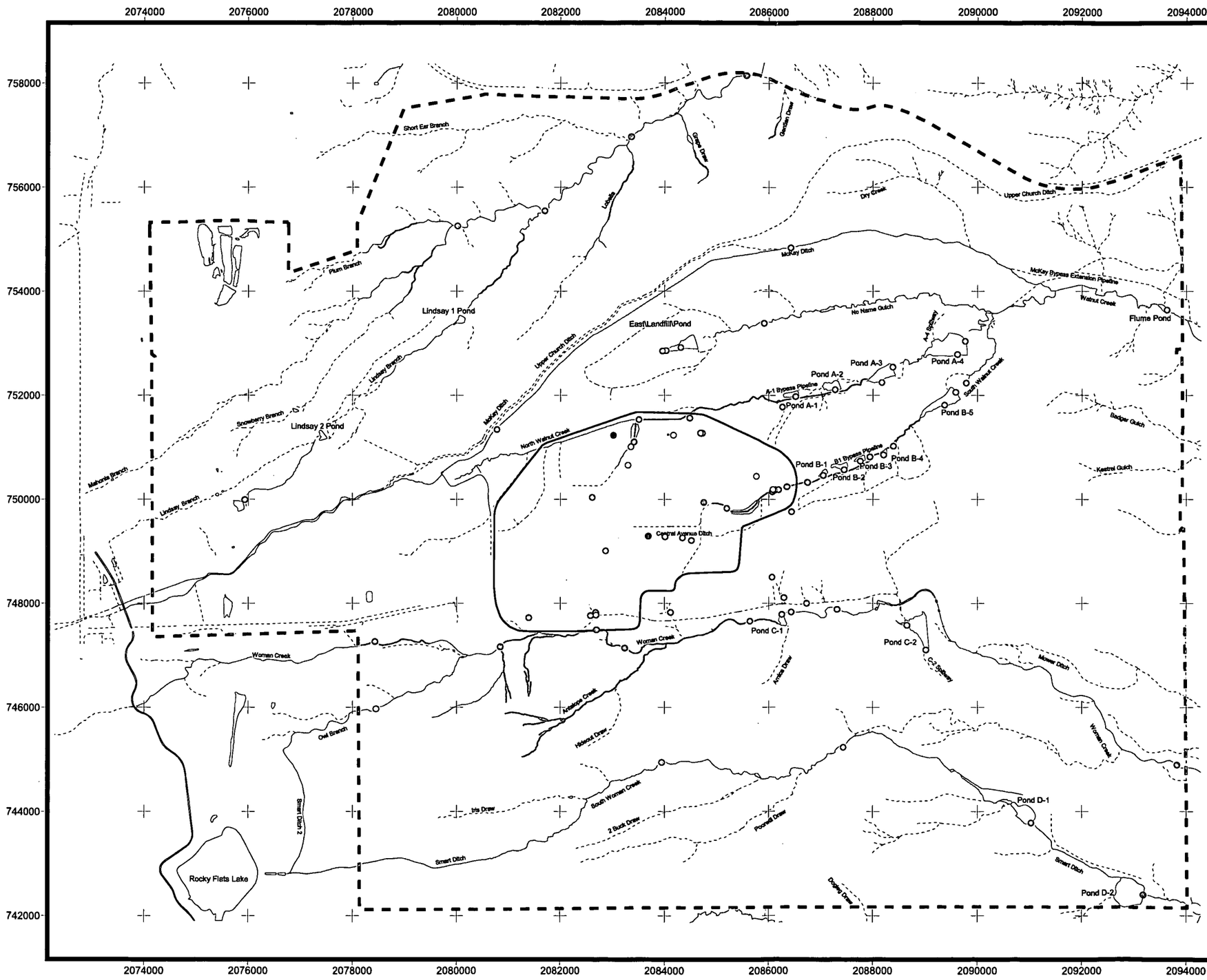

Figure 5.16

Total Nickel Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

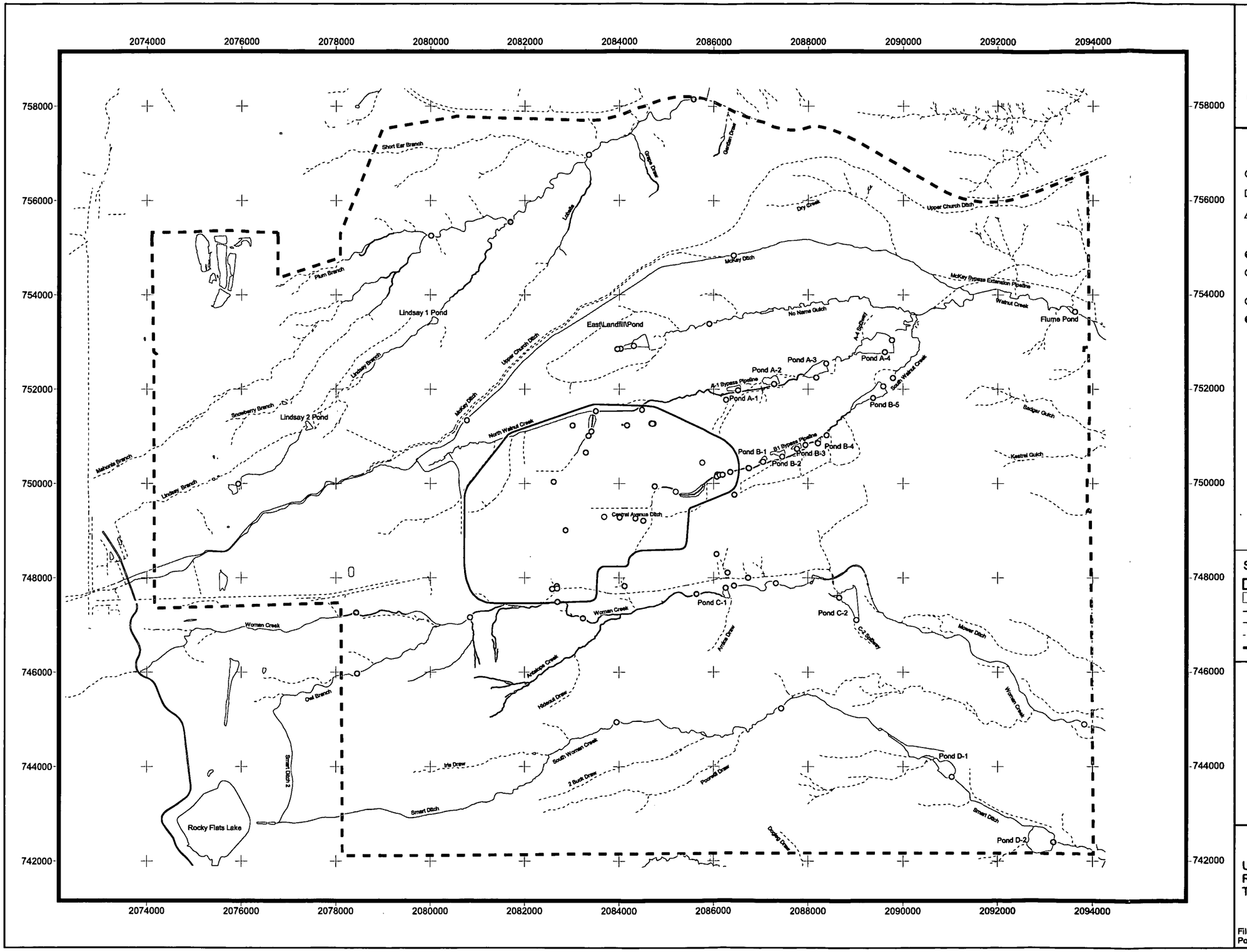

Figure 5.17

Total Zinc Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

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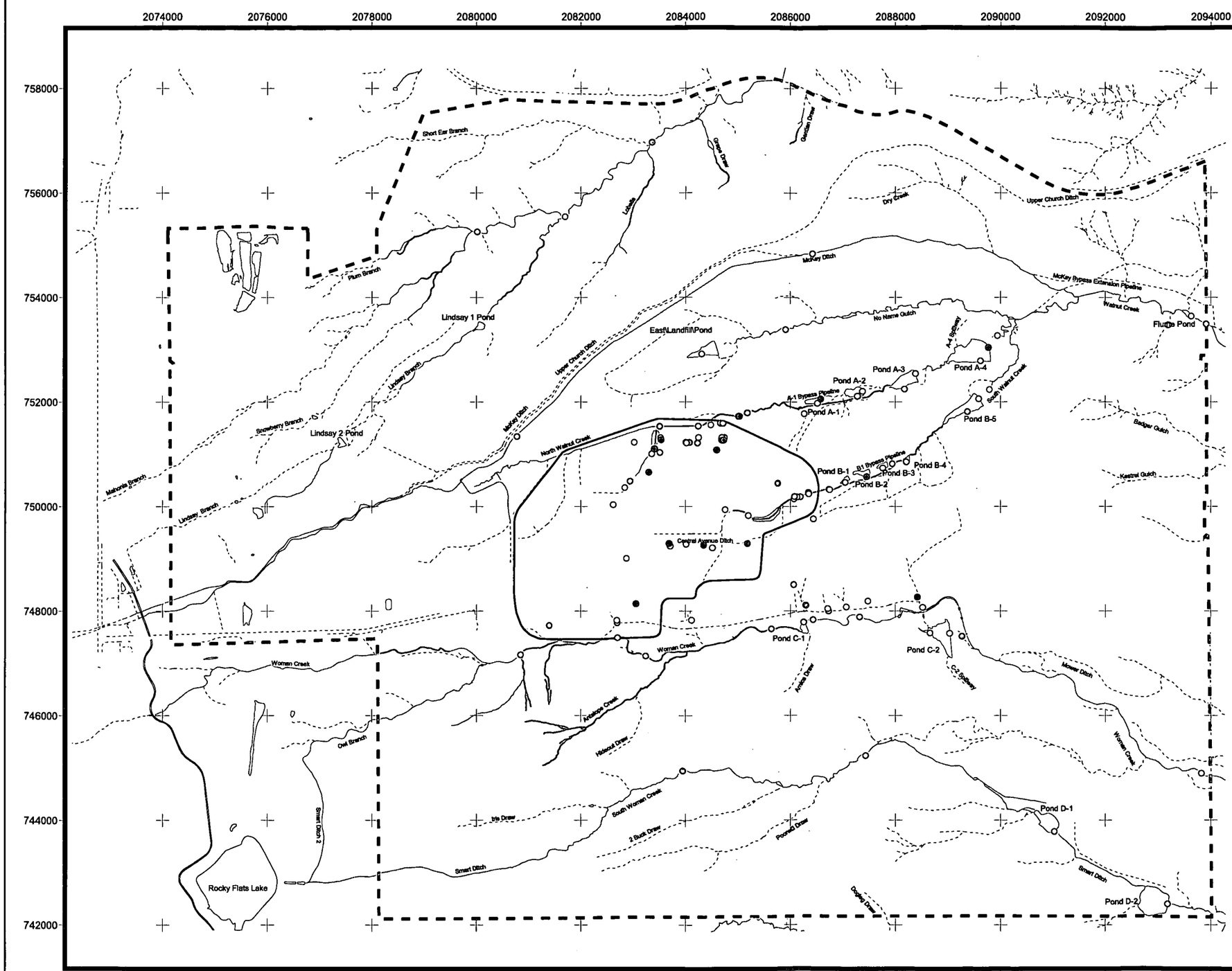

Figure 5.18

Total Americium-241 Activity in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

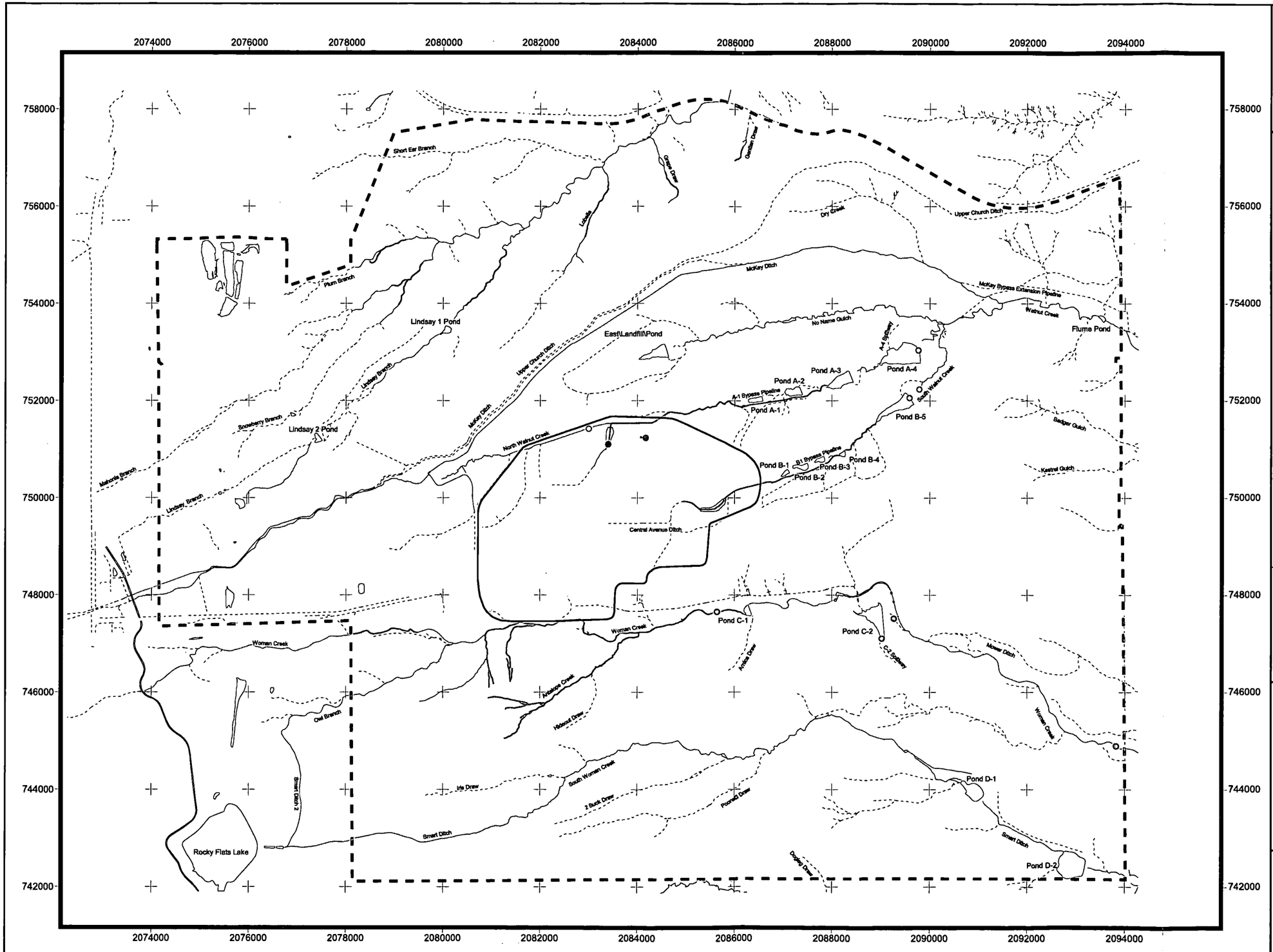

Figure 5.19

Total Gross Alpha Activity in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > M2SD
- ○ > Surface Water Standard and <= M2SD
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

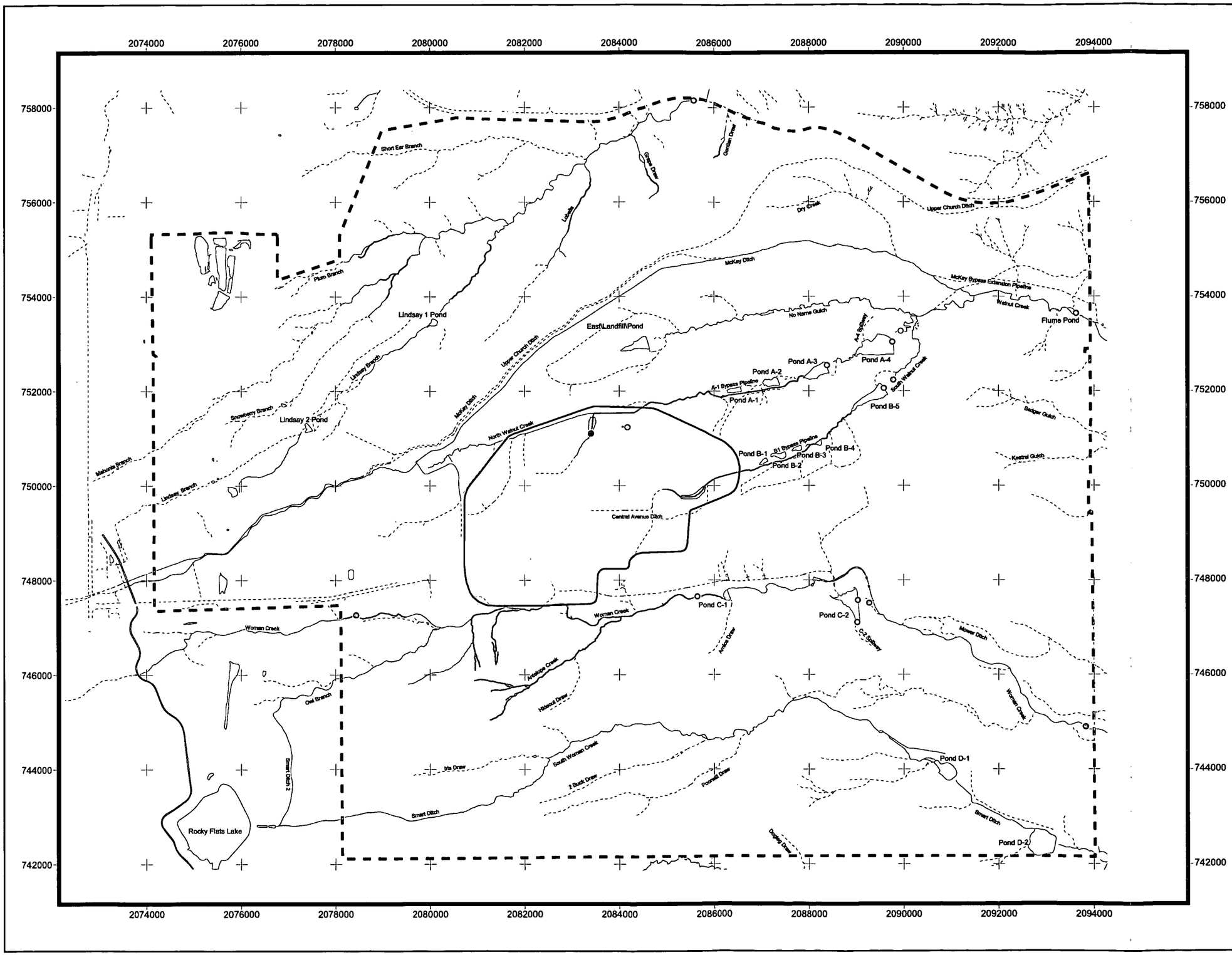

Figure 5.20

Total Gross Beta Activity in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > M2SD
- ○ > Surface Water Standard and <= M2SD
- ○ Detected and <= Surface Water Standard
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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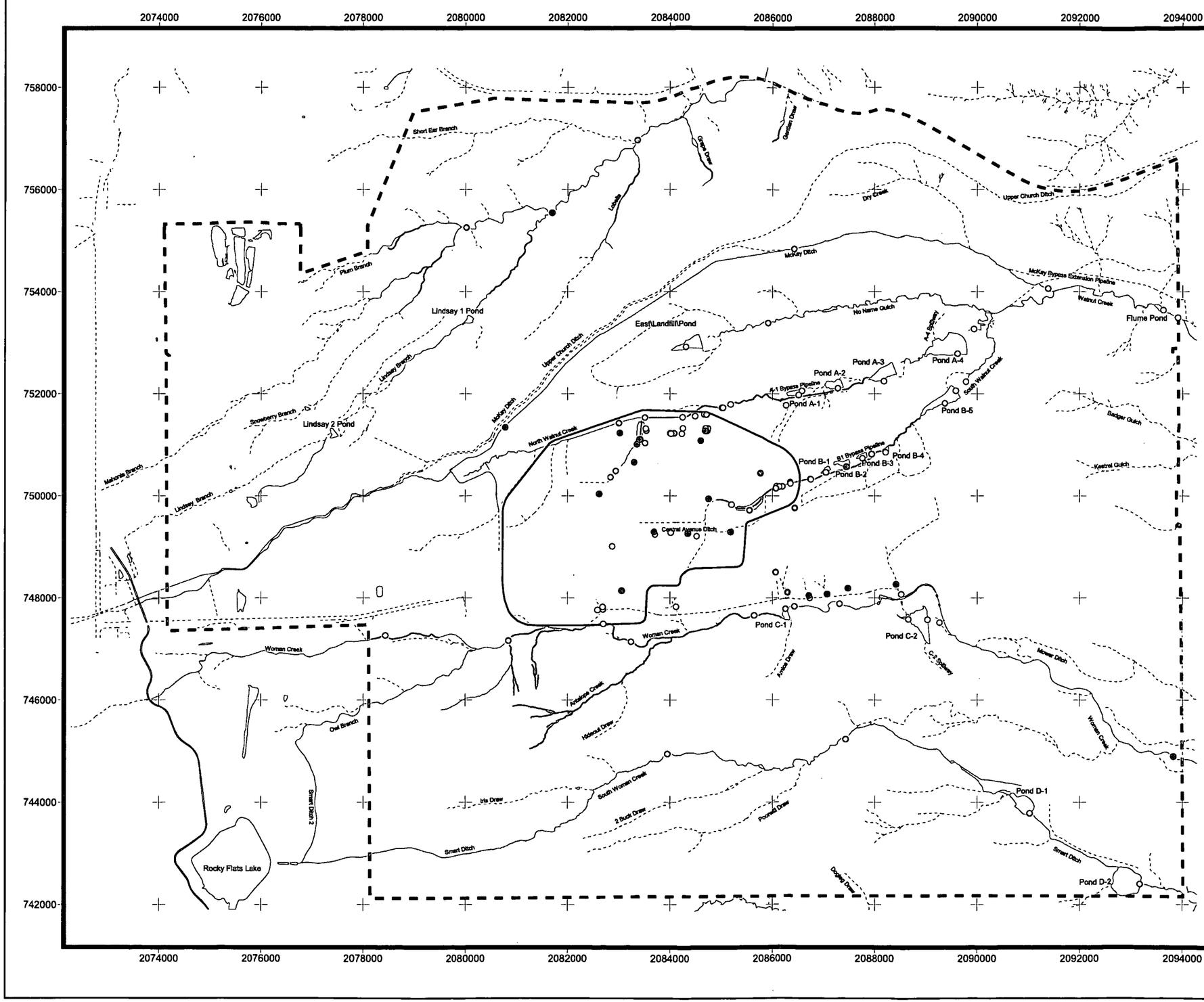

Figure 5.21

Total Plutonium-239/240 Activity in Surface Water

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > Surface Water Standard
- > M2SD and <= Surface Water Standard
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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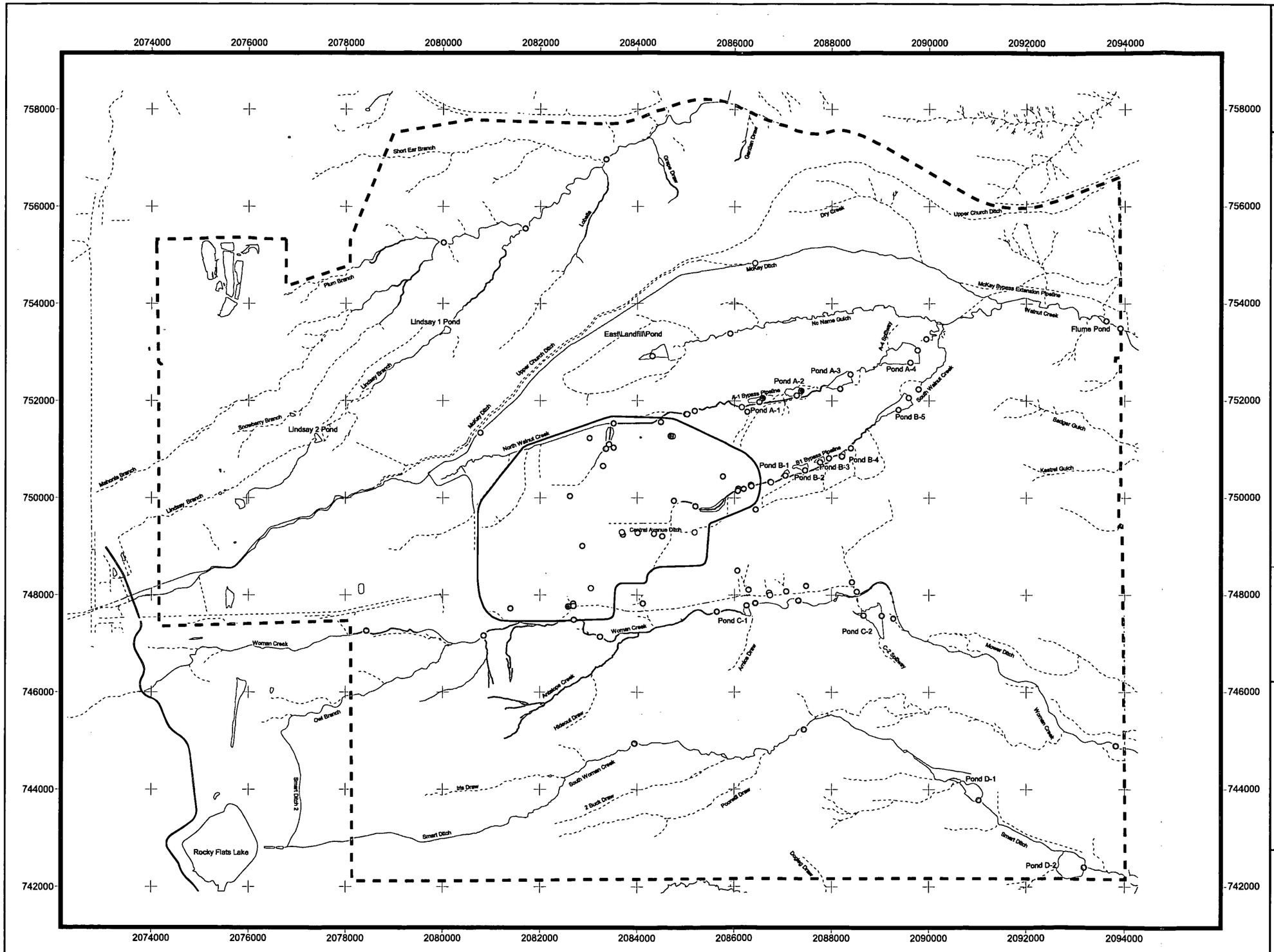

Figure 5.22

Total Uranium Isotopes Activity in Surface Water

Key

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > Surface Water Standard
- > M2SD and <= Surface Water Standard
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

File: W:\Projects\FY2005\Groundwater-Reports\Post-1999-SW\FINAL-Post-1999-SW.apr

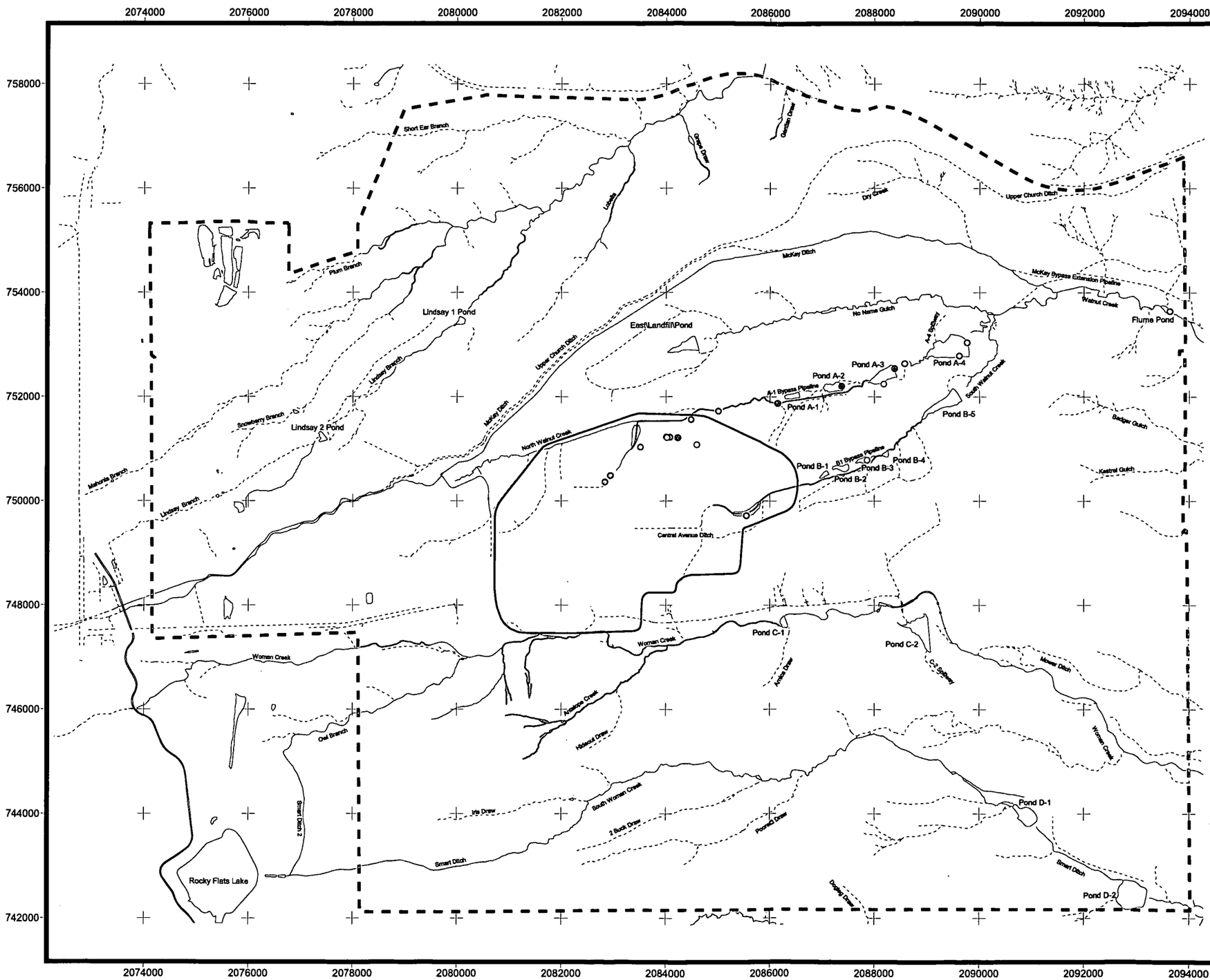

Figure 5.23

Nitrate/Nitrite (as N) Concentrations in Surface Water

Key

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > Surface Water Standard
- ○ > M2SD and <= Surface Water Standard
- ○ Detected and <= M2SD
- ● Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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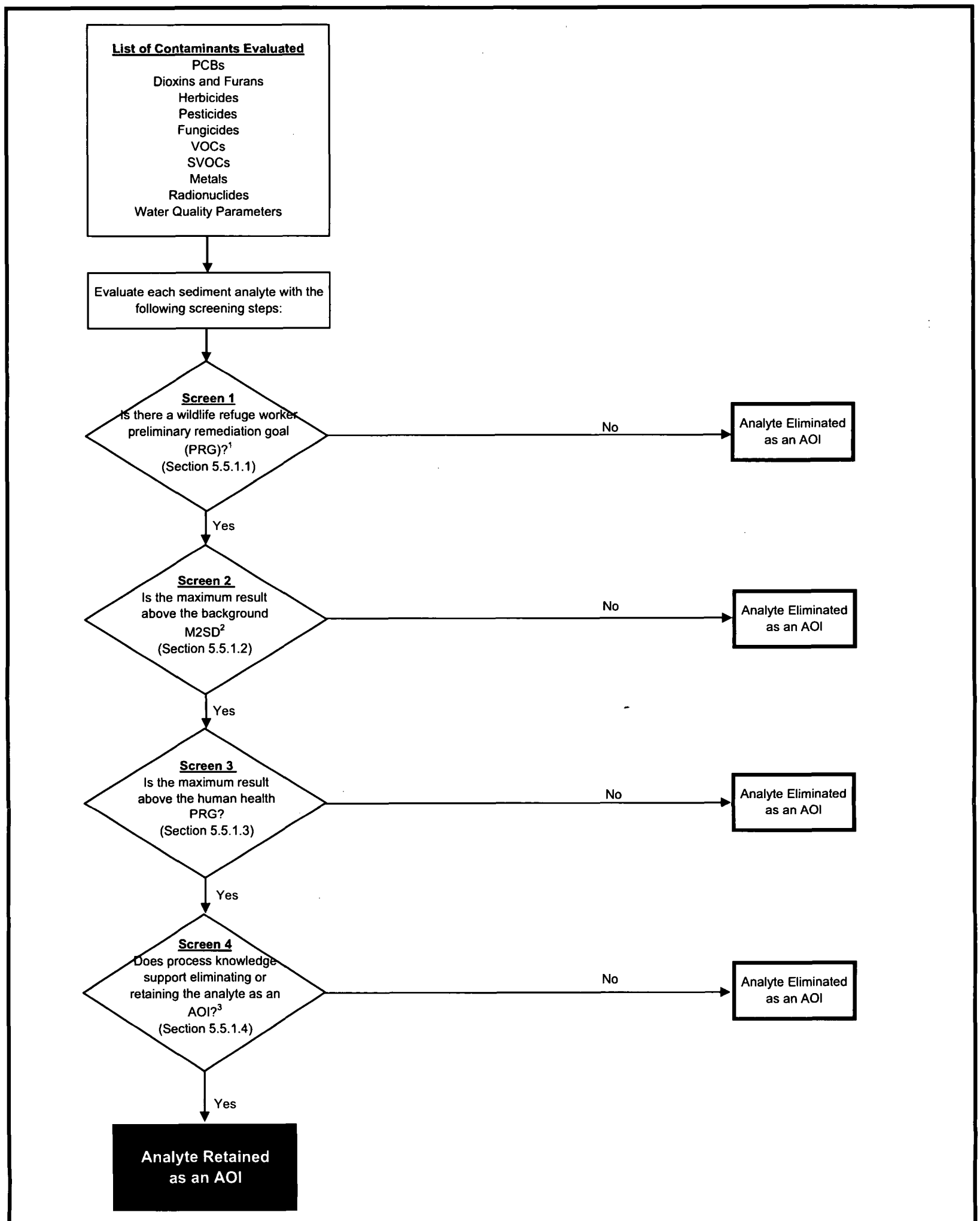
Figure 5.24
Sediment AOI Screening Process



Notes:

[1]Human health WRW PRG is based on a target excess carcinogenic risk of 1×10^{-6} or a hazard quotient (HQ) of 0.1.

[2]Background mean + two standard deviation values used to evaluate sediment nature and extent were developed for sediments in the CRA were developed using the regulatory agency-approved CRA Methodology (DOE, 2004). For constituents (organic compounds, some inorganic, and some radionuclides) that do not have background values, it was assumed that detection of these constituents above the analytical detection limit indicates their presence in the environment.

[3]DOE recognizes that process knowledge at RFETS is not perfectly known. However, process knowledge alone is not used to eliminate a constituent as an AOI. Other analyte criteria such as its areal distribution relative to RFETS activities, its proximity to contaminant sources, accelerated actions performed to remove contaminant source(s), and its natural occurrence and distribution in the environment are also considered when evaluating whether to retain or eliminate a constituent as an AOI.

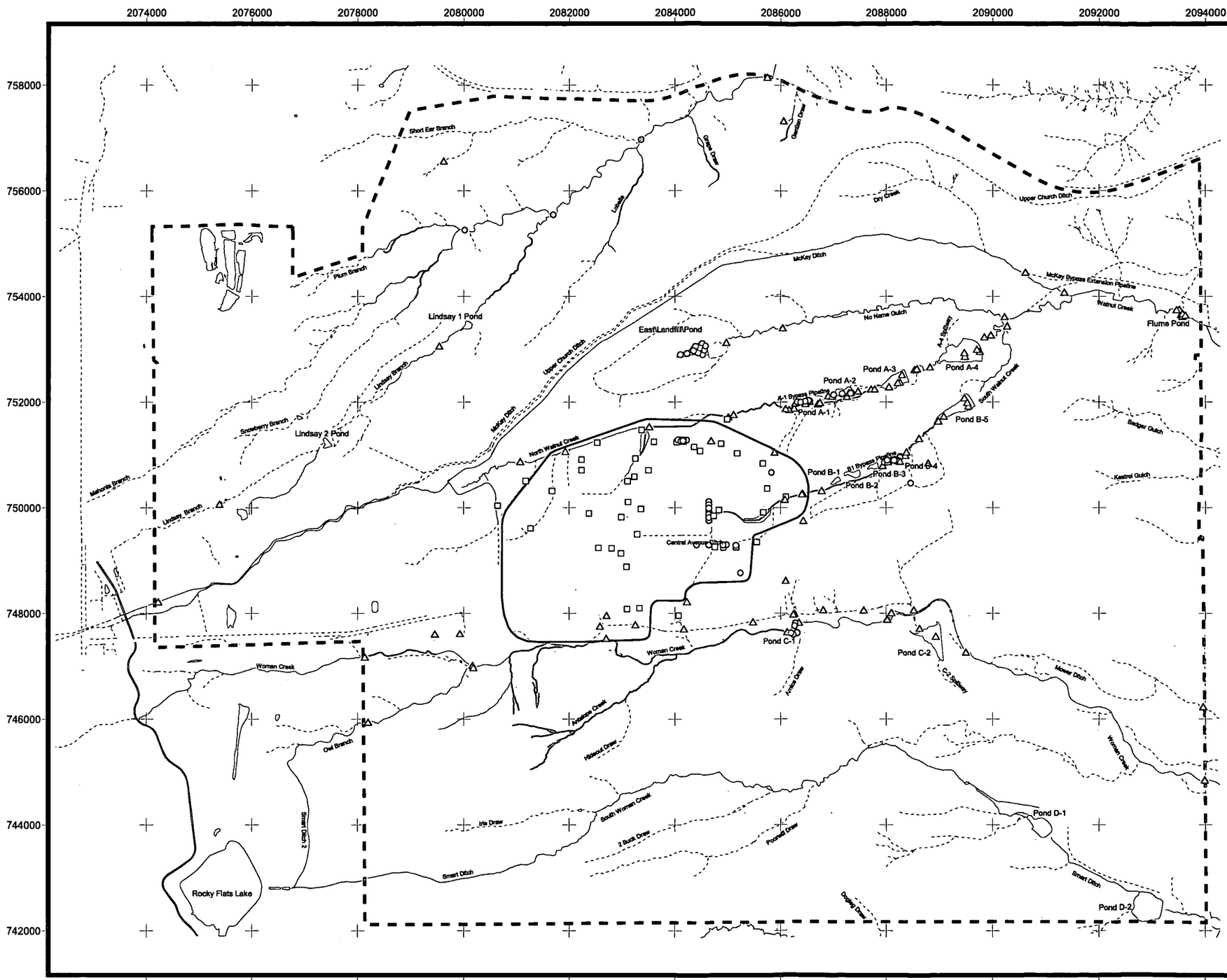


Figure 5.25

Benzo(a)pyrene Concentrations in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- Not applicable
- Detected and <= PRG
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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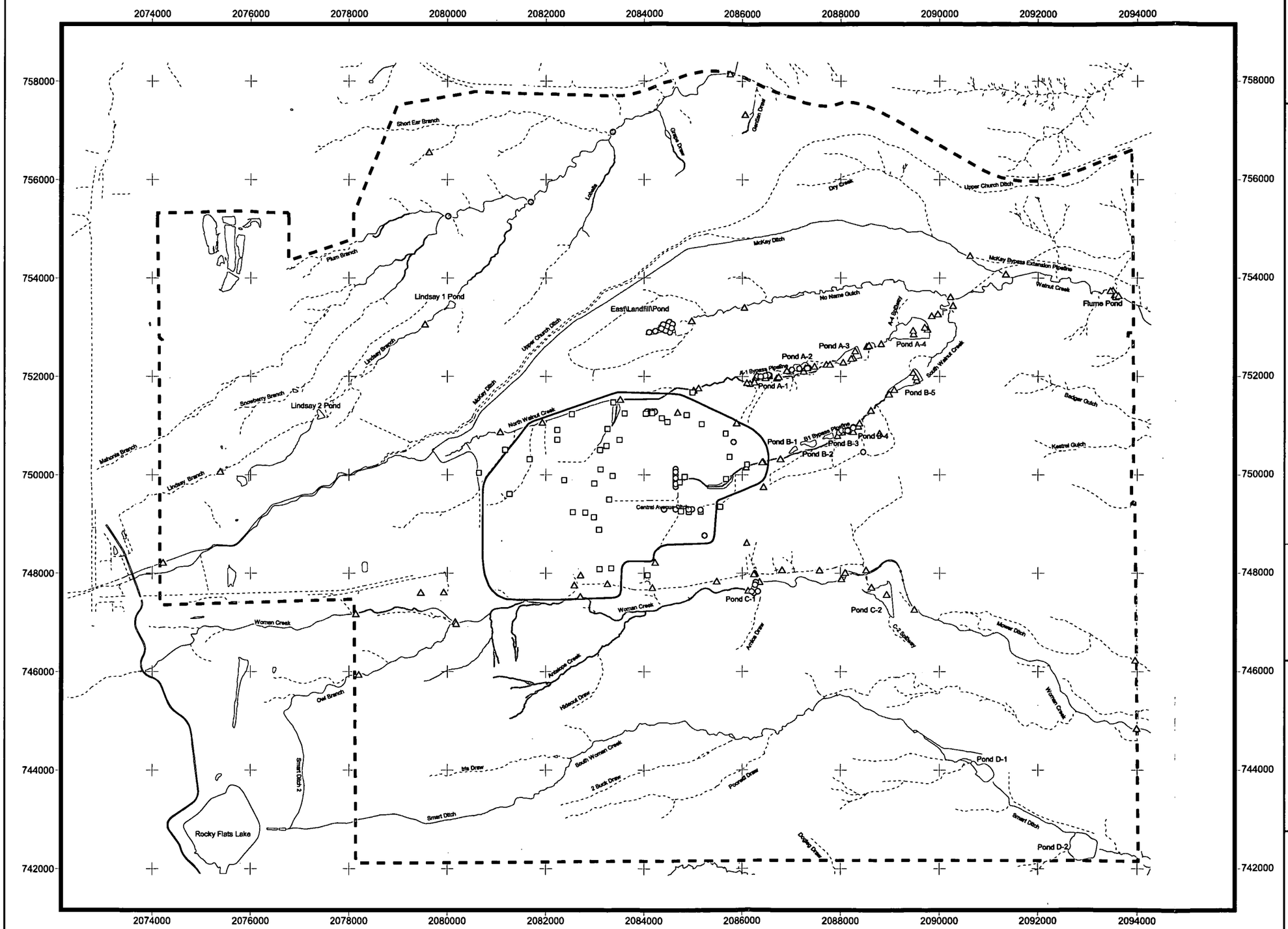

Figure 5.26

Dibenz(a,h)anthracene Concentrations in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- Not applicable
- Detected and <= PRG
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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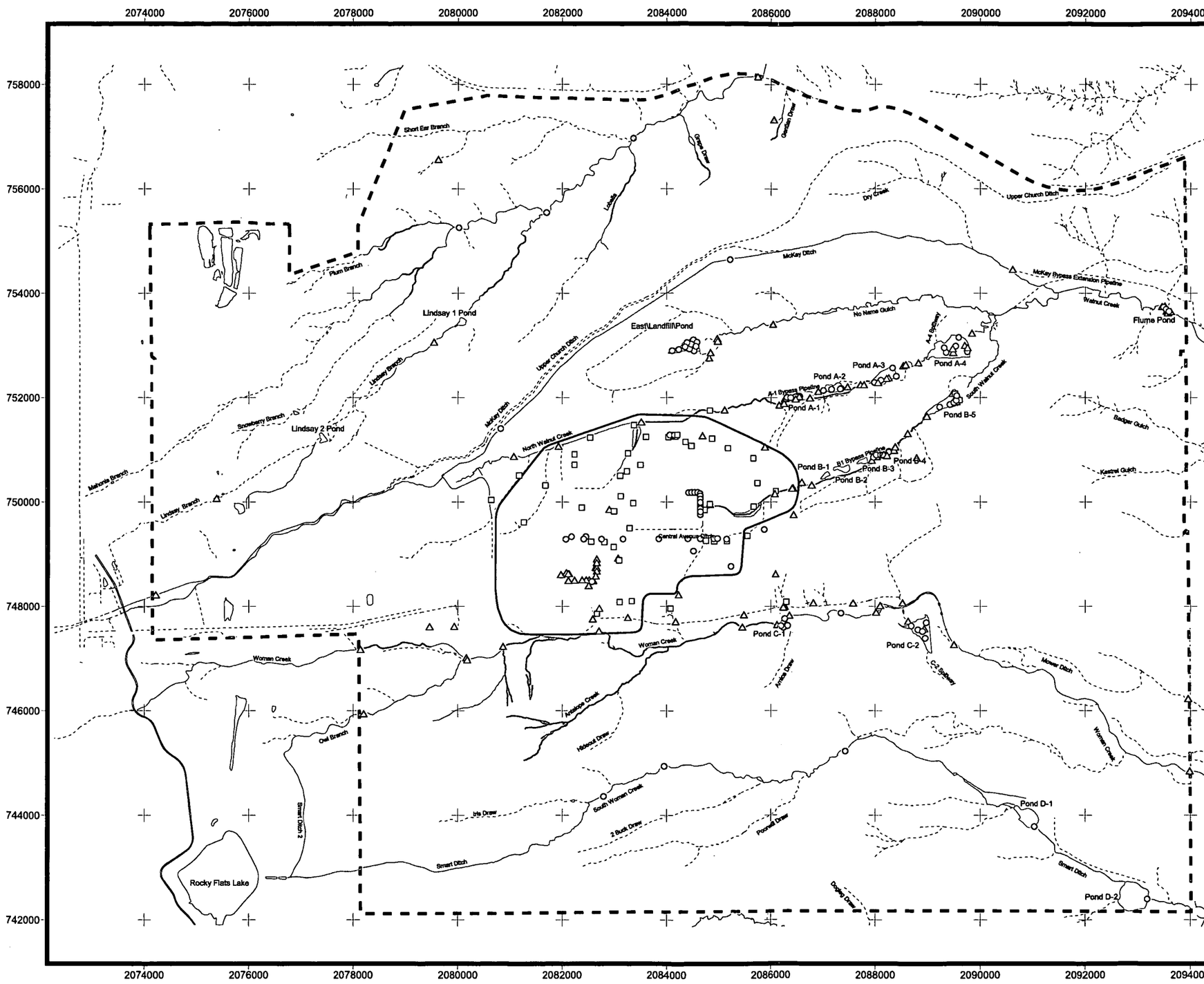

Figure 5.27

Antimony Concentrations in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- > M2SD and <= PRG
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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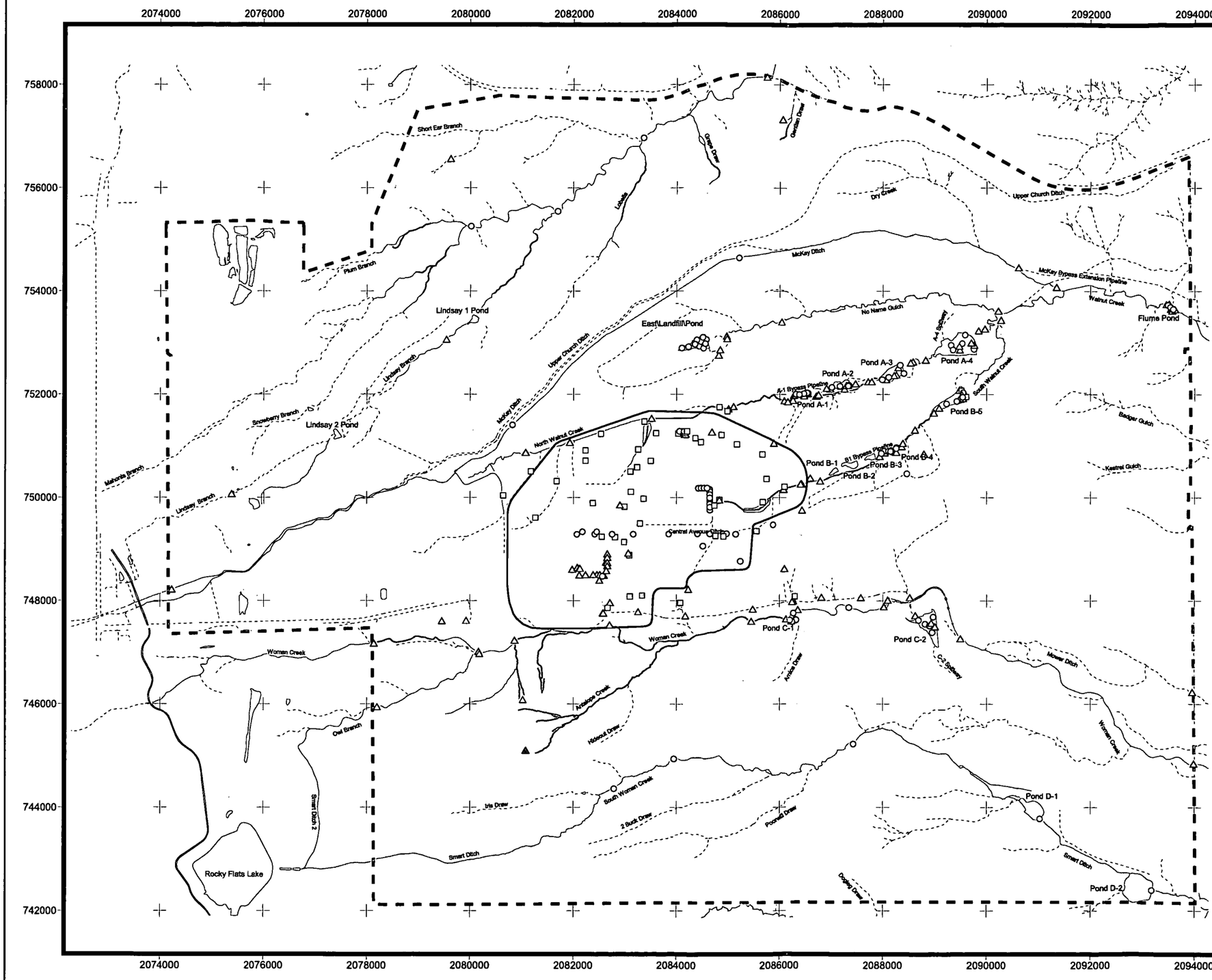

Figure 5.28

Arsenic Concentrations in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > M2SD
- > 10X PRG and <= M2SD
- > PRG and <= 10X PRG
- Detected and <= PRG
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N
W E
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0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental Technology Site

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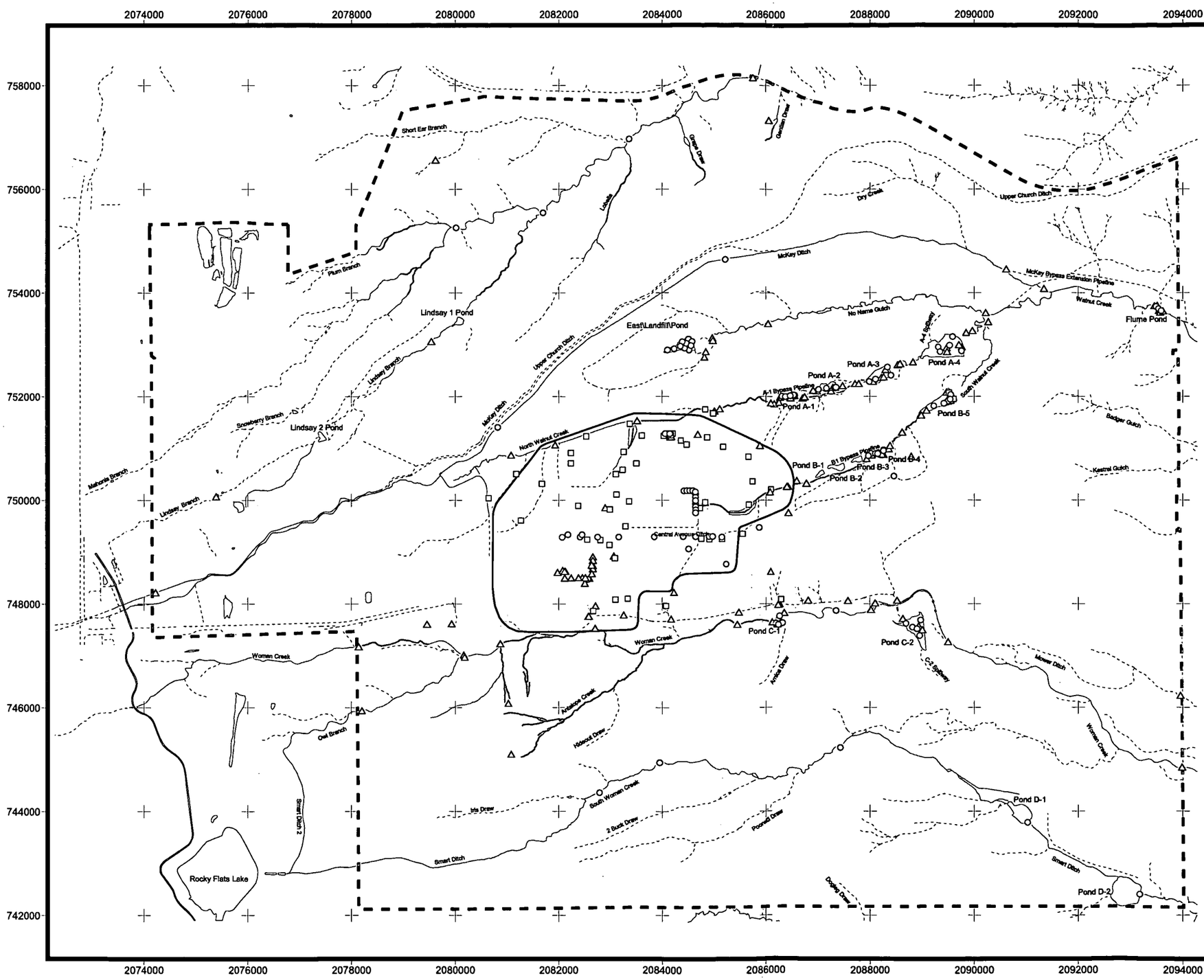

Figure 5.29

Chromium Concentrations in Sediment

KEY

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ⊕ > 10x PRG
- ○ > PRG and <= 10X PRG
- ○ > M2SD and <= PRG
- ○ Detected and <= M2SD
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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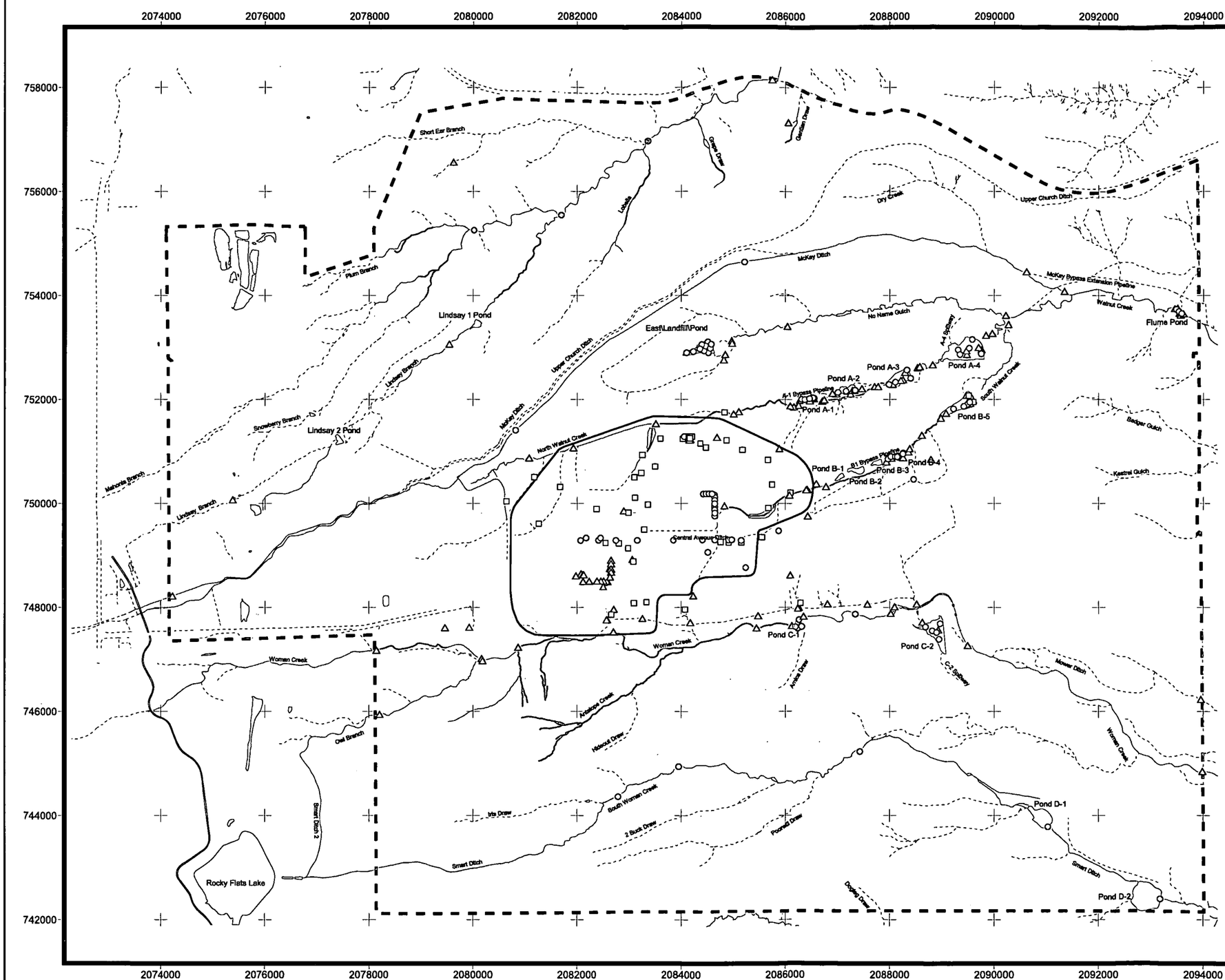

Figure 5.30

Silver
Concentrations in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- > M2SD and <= PRG
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N
W E
S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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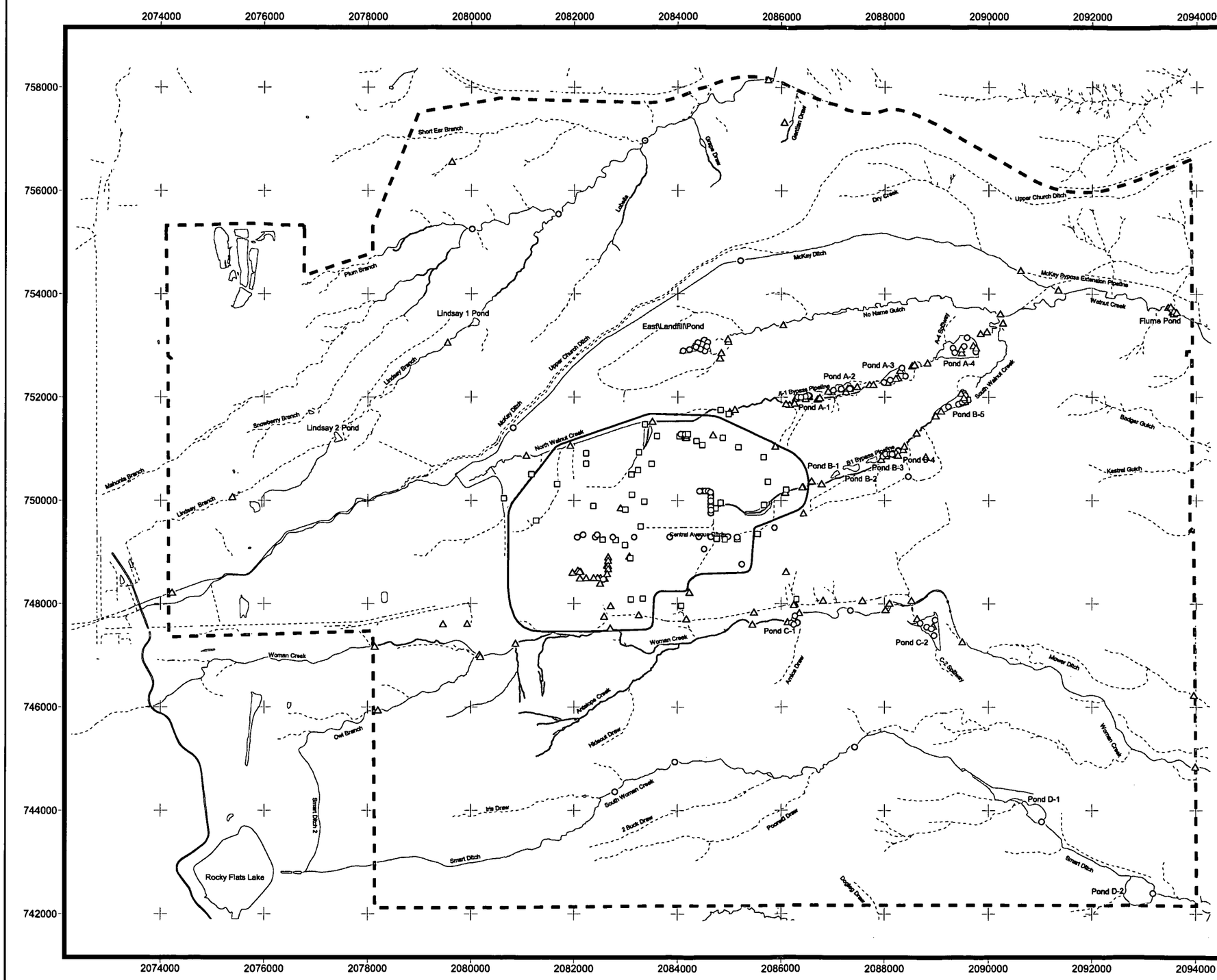

Figure 5.31

Thallium Concentrations in Sediment

KEY

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > 10x PRG
- ○ > PRG and <= 10X PRG
- ○ > M2SD and <= PRG
- ○ Detected and <= M2SD
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

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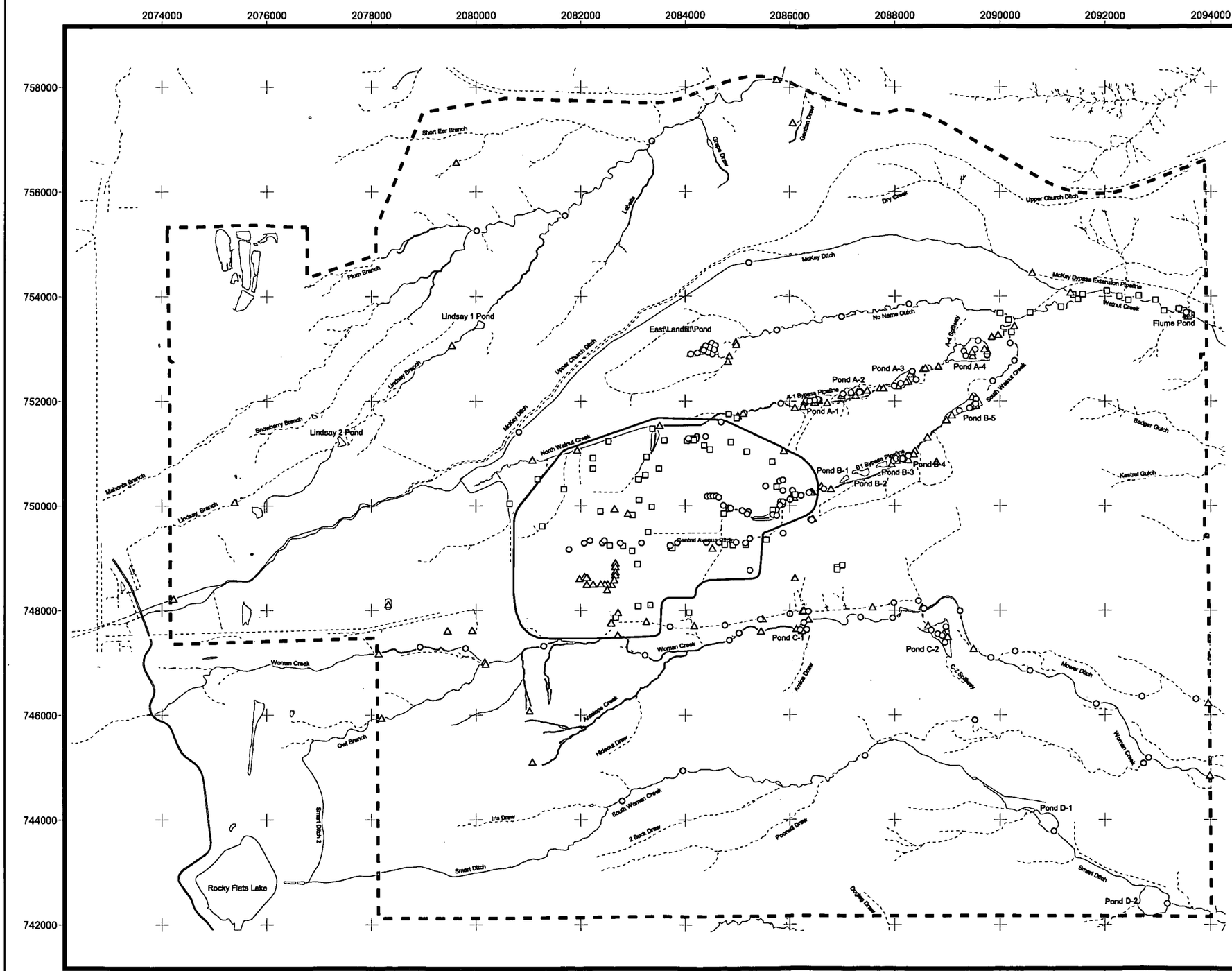

Figure 5.32

Americium-241 Activity in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- > M2SD and <= PRG
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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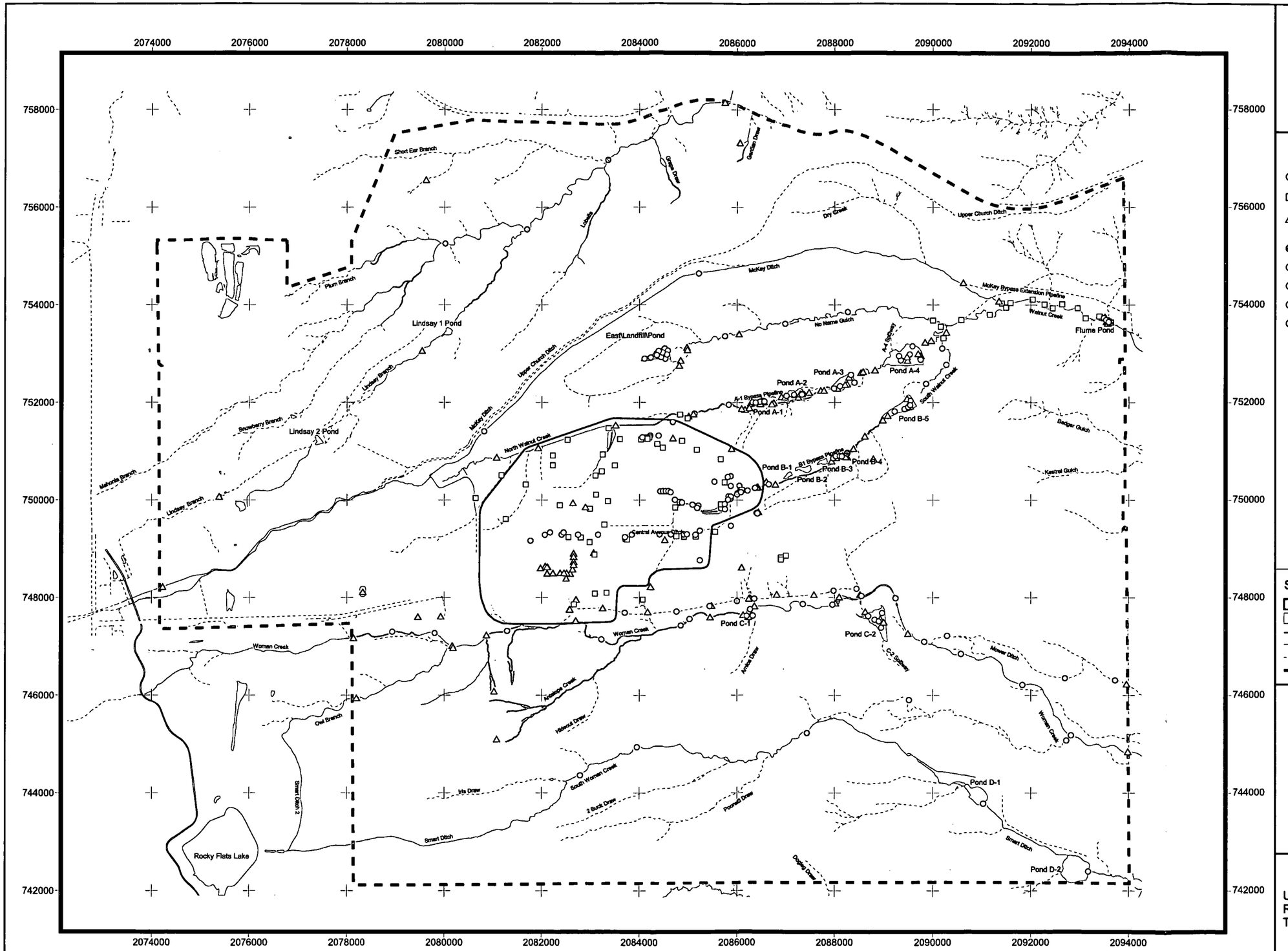

Figure 5.33

Plutonium-239/240 Activity in Sediment

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994
- > 10x PRG
- > PRG and <= 10X PRG
- > M2SD and <= PRG
- Detected and <= M2SD
- Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N W E S

0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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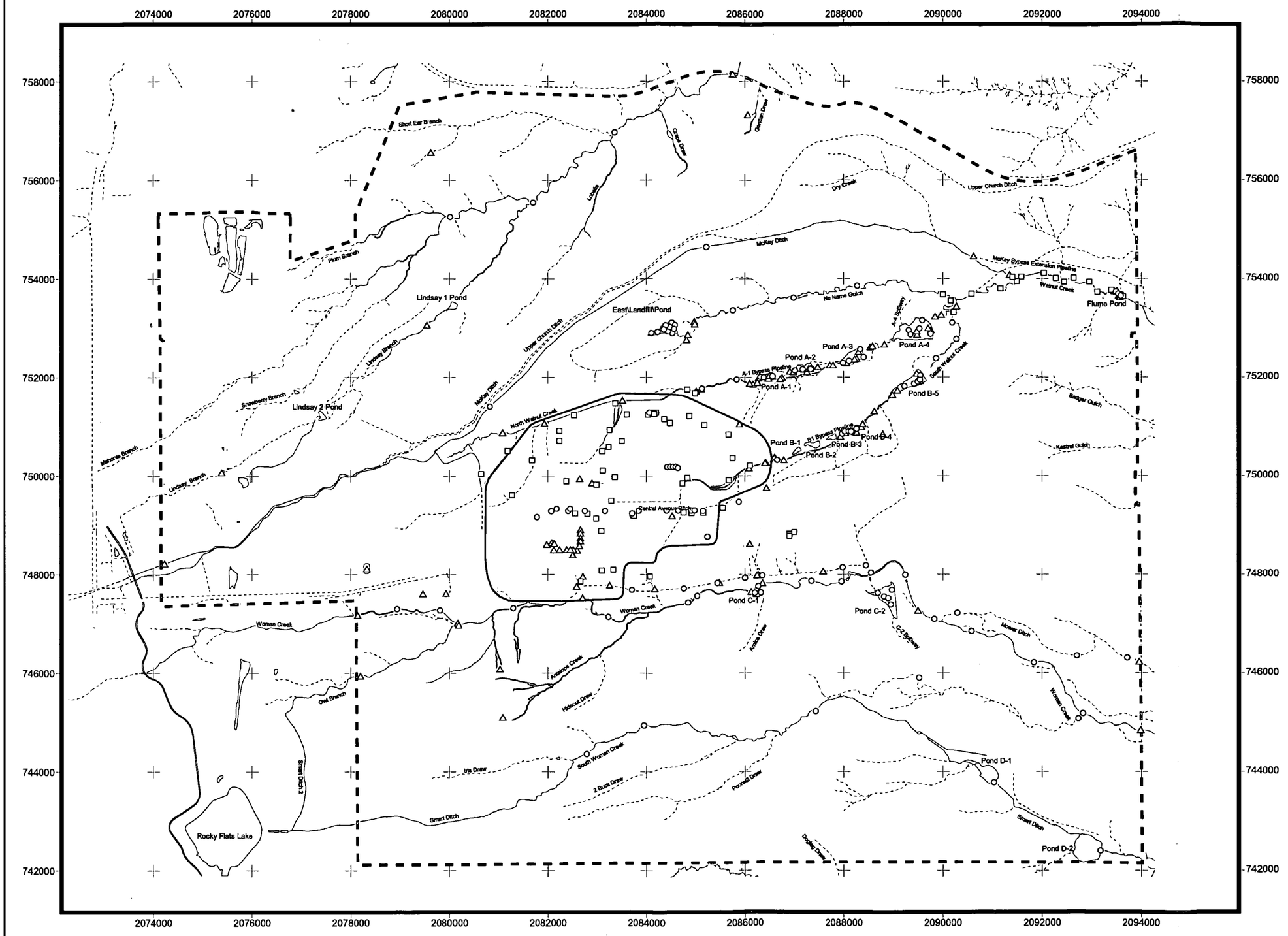

Figure 5.34

Uranium-238
Activity in Sediment

KEY

- ○ Sample collected since January 1, 2000
- □ Sample collected between January 1, 1995 and December 31, 1999
- △ Sample collected between June 28, 1991 and December 31, 1994
- ◉ > 10x PRG
- ○ > PRG and <= 10X PRG
- ○ > M2SD and <= PRG
- ○ Detected and <= M2SD
- ○ Not detected

Standard Map Features

- IAOU boundary
- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary

N
W E
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0 1000 2000 Feet

Scale 1:24,000

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Rocky Flats Environmental
Technology Site

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DRAFT

RCRA Facility Investigation – Remedial Investigation/ Corrective Measures Study – Feasibility Study Report for the Rocky Flats Environmental Technology Site

Section 6.0
Nature and Extent of Air Contamination

This Draft was prepared by Kaiser-Hill Company, L.L.C.
for the U.S. Department of Energy

October 2005

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6.0 NATURE AND EXTENT OF AIR CONTAMINATION

6.1 Introduction

The purpose of this section is to define the nature and extent of airborne contaminants at the Rocky Flats Environmental Technology Site (RFETS or site) after completion of Rocky Flats Cleanup Agreement (RFCA) accelerated actions. Information regarding ongoing sources of contaminant emissions to air will be considered in evaluating final remedy alternatives.

This section discusses historical airborne contamination sources, monitoring, and related studies. The following discussion is supported by and draws from the more detailed information in Section 3.0, Nature and Extent of Soil Contamination.

Monitoring programs and other studies were conducted during both the production era and cleanup phase at RFETS. Historical monitoring data are reviewed in Section 6.4. These data show that contaminant emissions and resulting ambient airborne concentrations during both the weapons production era and cleanup phase were always compliant with all regulatory requirements. With completion of accelerated actions, and consequently the removal of many historical air emissions sources, future RFETS air emissions will likely be less than those in the past.

6.2 Historical Air Contaminant Emissions Sources

During the weapons production era at RFETS, the major sources of airborne contamination comprised releases of radionuclides, volatile organic compounds (VOCs), and metals from stacks venting building processes and operations; conventional pollutant sources such as fuel combustion in boilers and generators, street sanding, traffic, refrigerant leaks, and fugitive dust from soil disturbance; and resuspension of contaminants deposited on surface soil by prior events (such as fires or leakage of radioactively contaminated oils and VOCs from drums stored at the 903 Pad). During the cleanup phase, building decommissioning and Environmental Restoration (ER) activities represented additional sources of emissions to air. These sources were eliminated or decreased as buildings were demolished and soil contamination was cleaned up.

RFETS released a variety of contaminants into the air from these sources. These contaminants included the six "criteria" pollutants, or their precursors, for which the U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards in Title 40 of the Code of Federal Regulations (CFR), Part 50: sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulate matter (PM), VOCs (regulated as a precursor to ozone), carbon monoxide (CO), and lead. Radioactive particles and tritium, a gaseous pollutant, were also released, along with ozone-depleting substances (ODS) and a number of hazardous or toxic contaminants.

A summary of both past and ongoing air emissions sources at RFETS is provided in Table 6.1.

6.3 Data Sources

The data reviewed in this section were drawn from a number of sources. These include both ambient and effluent radionuclide monitoring conducted by DOE and their contractors at RFETS, monitoring for VOCs conducted at the fenceline of RFETS by the Colorado Department of Public Health and Environment (CDPHE), a special purpose VOC monitoring program conducted by RFETS in the Industrial Area (IA) in 1995-1996, and project-specific beryllium monitoring conducted by RFETS during decommissioning of specific buildings on site with historical beryllium usage. In addition, modeling has been performed for landfill emissions using EPA methods to determine probable landfill gas emissions.

Data adequacy and quality have been reviewed for the RFETS radionuclide and beryllium monitoring and this discussion is contained in Attachment 1 to this section. Other data used to determine pollutants of potential concern for air were derived from published sources and the data adequacy/quality of those investigations is not reviewed here. Attachment 2 to this section contains the RFETS data used to determine the nature and extent of air contamination.

6.4 Identification of Air Pollutants of Potential Concern

This section discusses the air pollutant sources that have historically operated at RFETS and the pollutants that have been emitted. The information provided serves as a screening process to determine which sources and analytes, if any, should be evaluated further to quantify their nature and extent following completion of accelerated actions.

6.4.1 Radionuclide Sources

Radionuclide emissions to air have historically included releases from radionuclide processing and waste handling, emitted through building stacks and vents; releases caused by mechanical disturbance of contaminated soil or debris during project activities, including ER and decommissioning projects; and resuspension of contaminated surface soil by wind. Plutonium-239/240 and americium-241 were deposited on surface soil at RFETS by waste management practices (for example, release from stored waste at the 903 Pad) or by emissions from building stacks and vents (from accidental releases caused by building fires, as well as routine emissions). Wind or mechanical disturbance of the contaminated soil resulted in radionuclide-laden soil particles becoming airborne. These suspended particles were transported some distance downwind before being redeposited on the ground or in water by a variety of mechanisms that remove particles from the air, such as rainout or dry deposition. Concentrations of plutonium and americium in surface soil are low, with the aerial extent of surface contamination extending generally from the IA in decreasing concentrations eastward. Uranium contamination in surface soil is also present but, unlike plutonium and americium, is not widespread and exists in small, localized areas (see Section 3.0, Nature and Extent of Surface Soil Contamination).

A large-scale, continuous environmental air monitoring program for radionuclides has been conducted at RFETS since 1971. The program was designed to quantify potential public exposure to radionuclides as a result of RFETS activities, and to determine compliance with applicable regulatory limits. It included two distinct tasks: effluent

monitoring, accomplished through the continuous extraction of entrained particulate matter from exhaust ducts of buildings with significant potential to release radionuclides; and ambient monitoring, accomplished through the continuous collection of airborne particulate matter at representative locations on and around RFETS. Limited effluent monitoring for tritium was also conducted for many years but was discontinued in November 2000 because no potential tritium sources remained at RFETS. Effluent monitoring was discontinued at all locations as the buildings where effluent monitoring was conducted were decommissioned and demolished. (RFETS ambient data used to determine the nature and extent of air contamination are included on a CD-ROM as Attachment 2 to this section.)

Radionuclide emissions from RFETS are subject to 40 CFR Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon From Department of Energy Facilities" (Colorado Air Quality Control Commission [CAQCC] Regulation No. 8, Part A, Subpart H) (EPA 1989). Since 1998, 14 ambient air samplers arrayed around the RFETS perimeter have been used to demonstrate compliance with the emission limits of 40 CFR 61, Subpart H. Filters were exchanged monthly and analyzed for the plutonium, americium, and uranium isotopes of interest. The maximum measured monthly off-site dose rates for 1999 through 2004, presented as a percentage of the 10-millirem (mrem) annual dose limit in 40 CFR 61, Subpart H, are shown on Figure 6.1 (see Attachment 2). On an annual basis, maximum measured radionuclide concentrations, including uranium isotopes that are largely naturally occurring in the environment, totaled less than 3 percent of the annual dose limit between 1998 and 2004. Cleanup of surface soil contamination and completion of radionuclide processing, waste handling, and decommissioning has lessened this dose potential even more (DOE 1999, 2000, 2001, 2002a, 2003a, 2004a). Although the off-site dose rate is highest in year 2003, while substantial cleanup efforts were occurring at RFETS, the elevated dose does not appear to be related to RFETS activities. Instead, the sampler at which the elevated dose rate occurred is located north of the site, adjacent to a dirt road that saw increased levels of traffic due to residential and commercial development in the area. The traffic stirred up dust containing naturally occurring uranium isotopes, which drove up ambient concentrations measured by the sampling device.

Ambient samplers were also used to monitor fugitive radionuclide emissions from decommissioning, demolition, and ER activities. In addition to the perimeter compliance demonstration network, for many years RFETS operated an internal network of samplers in and around the IA during project activities that could result in radionuclide emissions (see RFETS Quarterly Environmental Monitoring Reports for October-December 2001 and later for project monitoring results; for example, DOE 2002b). The measurements indicate that RFETS has remained in compliance with all regulatory requirements even during periods of substantial decommissioning and ER activities. For example, an approximate 7-year record of radionuclide concentrations (1997 - 2003) at a sampler located downwind of the 903 Pad shows annual average dose rates three orders of magnitude below the 40 CFR 61, Subpart H, 10-mrem benchmark, with peak monthly dose rates two orders of magnitude below the 10-mrem level, even though this standard only applies beyond the RFETS fenceline, 2 to 3 kilometers beyond this sampling location (see data for sampler S-107 in Attachment 2 to this section). Both off-site and

on-site measurements have been reported at quarterly data exchange meetings with EPA and CDPHE staff and representatives from surrounding municipalities. These results are documented in the RFETS Quarterly Environmental Monitoring Reports (for example, DOE 2003b).

6.4.2 Landfill Sources

Both the Present Landfill and Original Landfill (OLF) represent potential sources of VOC and hazardous air pollutant (HAP) emissions primarily due to the decomposition of buried, decomposable waste. Decomposition of waste, along with possible volatilization of certain constituents and/or chemical reactions within the waste, generates landfill gas (LFG). Methane and carbon dioxide (CO_2) are the primary constituents of LFG, and are produced by microorganisms within the landfill under anaerobic conditions. LFG generation proceeds through several phases as the waste "ages," and the gas composition changes with each phase. Typically, LFG also contains a small amount of nonmethane organic compounds (NMOCs). NMOCs can contain various HAPs, greenhouse gases, and compounds associated with stratospheric ozone depletion. The NMOC fraction also contains VOCs. Maximum VOC and HAP emission potential occurs at the time waste is last placed in a landfill and shortly thereafter; emissions from waste decomposition decrease with time as the waste decays.

6.4.2.1 Present Landfill

The Present Landfill is located in the No Name Gulch drainage and occupies approximately 20 acres. It was placed into service in August 1968 for the disposal of solid wastes, including office trash, paper, rags, personal protective equipment (PPE), construction and demolition debris, scrap metal, empty waste containers, used filters, and electrical components. Although originally planned as a sanitary landfill, refuse disposed of also included materials containing polychlorinated biphenyls (PCBs); combustible materials contaminated with small amounts of beryllium; containers partially filled with paints, solvents, and foam polymers; Kimwipes and rags contaminated with organic compounds; metal cuttings and shavings (primarily stainless steel); tear gas powder; a tank containing Mercaptan™ (an odor additive to natural gas); a drum of solidified polystyrene resin; soil contaminated with approximately 700 gallons of diesel fuel; wood contaminated with chromium and aluminum oxide; and unknown chemicals and reactive chemical residues. Wastes with hazardous constituents ceased to be disposed of in the landfill by fall of 1986. Sludge from the sanitary waste treatment plant was routinely disposed of at the Present Landfill from August 1968 through May 1970, and may have contained low levels of plutonium and depleted uranium (DOE 2004b).

Wastes delivered to the landfill were spread across the work area, compacted, and covered with a daily soil cover. From 1968 to 1978, the landfill received approximately 20 cubic yards (cy) of compacted waste per day. The Present Landfill remained in operation until March 1998, at which time it was placed in a contingent closure status and seeded to stabilize soil and control erosion. The volume of material in the landfill at the time it became inactive was estimated at 415,000 cy, including any daily soil cover incorporated as the waste was placed (DOE 2004b).

A RFCA accelerated action at the Present Landfill to install a landfill cover was completed in 2005. Barometric gas vents were placed into the landfill prior to placement of the final cover to allow pressure equalization (DOE 2004b). These vents represent a preferred pathway for LFG migration to the atmosphere. The rate of gas generation and release is a function of the waste composition in the landfill, waste volume, and age of the landfill.

In 2002, EPA's Landfill Emissions Model Version 2.0 (LANDGEM) was used to calculate total landfill gas emissions. Model results indicated relatively low rates of LFG generation, with the majority (approximately 80 percent) of methane and total LFG production occurring by 2025, and almost all potential production occurring by 2075 (K-H 2002). Gas generation calculations were revised for this section assuming a more appropriate arid area methane rate constant than was used in the 2002 modeling (see Attachment 2). The model-estimated peak year LFG generation rate (1998) was approximately 288,200 cubic meters per year (19.5 cubic feet per minute [cfm]).

LANDGEM was also used to estimate emissions of NMOCs. The calculation assumed a conservative default NMOC concentration in the landfill gas from EPA's Compilation of Air Pollutant Emission Factors (AP-42) (EPA 1995). Peak year (1998) NMOC emissions were estimated at approximately 2.5 megagrams per year (Mg/yr) (approximately 2.8 tons per year). Note that emissions of LFG are not the target of regulation under the federal Clean Air Act (CAA) because the principal components, methane and CO_2, are neither toxic nor precursors to other regulated pollutants, such as ozone or PM_{10}. CAA regulations instead focus on controlling or limiting emissions of certain trace components of LFG, such as NMOCs, that may include toxic contaminants or promote secondary pollutant formation.

Municipal solid waste landfill air emissions are regulated under 40 CFR 60, Subparts WWW and Cc (New Source Performance Standards and Emission Guidelines, respectively) (EPA 1996a, 1996b). These regulations apply to new landfills (Subpart WWW) and existing landfills (Subpart Cc). The applicability of these standards to the Present Landfill was evaluated in 1997 when these regulations became effective. Subpart Cc, which would apply to existing units such as the Present Landfill, applies to municipal solid waste landfills constructed or modified before May 30, 1991, which have design capacities greater than or equal to 3.3 million cy. The maximum design capacity of the Present Landfill was determined to be 571,000 cy, well below the 3.3 million cy threshold. CDPHE was notified of the nonapplicability of this regulation on July 10, 1997 (DOE 1997).

For perspective, Subparts WWW and Cc only require emission controls for landfills meeting the above criteria that also have NMOC emissions exceeding 50 Mg/yr. The calculated emission rate from the Present Landfill in 1998 was only 2.5 Mg/yr, far below the control threshold. Because the maximum VOC and HAP emission potential occurs at the time the waste is last placed into the landfill and shortly thereafter, emissions from

waste decomposition decreases with time as the waste decays. Consequently, future emission rates will be even lower, supporting the contention that airborne emissions from the Present Landfill do not pose a threat to health or the environment.[1]

6.4.2.2 Original Landfill

Between 1952 and 1968, approximately 74,000 cy of solid sanitary waste and construction debris were placed in the OLF. The landfill was not designed or operated as an engineered landfill. The waste material was covered with a soil layer after disposal operations ceased. Accurate and verifiable records of the waste placed in the landfill are not available; however, the types of waste that may have been placed in the landfill include relatively small quantities of organic compounds, paint and paint thinner, oil, pesticides, and cleaners, as well as municipal-type solid waste.

Organic compounds commonly used from 1952 to 1968 may have included trichloroethene, carbon tetrachloride, tetrachloroethene, petroleum distillates, 1,1,1-trichloroethane, dichloromethane, and benzene. In the 1960s, the landfill may have received PCB wastes such as carbonless copy paper, transformer and vacuum pump cleanup paper and rags, small capacitors, and fluorescent light bulbs. Metals such as beryllium, lead, and chromium may also have been placed in the landfill (DOE 2004c).

Activities listed for the landfill in October 1954 included its use as a burn pit for the Plant (EG&G 1992). Ash from the Plant incinerator, graphite, used caustic drums, and general trash may have been dumped in the burn pit; however, no records of waste types have been found. In 1995, geotechnical investigations were conducted at the OLF and the fill material encountered was described, including sheet metal, wood, broken glass, plastic, rubber, metal shavings, graphite sand, solid blocks of graphite, concrete, asphalt, and portions of 55-gallon steel drums. Street cleaning wastes were also apparently dumped at the OLF area (DOE 2004c).

There is no information indicating that the OLF was used for routine disposal of radioactive material or other hazardous substance waste streams. During the period of operation of the OLF, several other areas within RFETS were used for the management and disposal of hazardous Plant wastes, including radioactive waste. Various controls and practices were used to segregate and manage radioactive wastes separately from Plant sanitary waste and construction debris (DOE 2004c).

EPA's Compilation of Air Pollutant Emission Factors (AP-42) (EPA 1995) describes methods to calculate methane and NMOC emissions from landfills using a theoretical first-order kinetic model of methane production developed by EPA (the same methodology employed by the LANDGEM model discussed above). Using 74,000 cy of waste, arid area default values for methane generation potential and methane generation

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[1] LFG was also evaluated in the Final Interim Measure/Interim Remedial Action (IM/IRA) for Individual Hazardous Substance Site (IHSS) 114 and Resource Conservation and Recovery Act (RCRA) Closure of the RFETS Present Landfill (DOE 2004b).

rate constant, and assuming co-disposal of hazardous wastes (worst-case assumption), the equations yield an estimated LFG production/emission rate of 14 cfm for 1968. NMOC emissions of 4 Mg/yr were estimated for the same time period (see Attachment 2 to this section).

These emissions probably represent substantial overestimates because much of the disposed material was not organic (that is, would not generate LFG) and hazardous wastes were not routinely disposed of in the OLF. The Operable Unit (OU) 5 Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) concluded that the OLF does not generate hazardous concentrations of LFG, so no gas collection or treatment action is required (DOE 2004c). As with the Present Landfill, the OLF is not subject to 40 CFR 60, Subpart Cc, because its design capacity is below the threshold level of 3.3 million cy. The estimated peak year NMOC emission rate (less than 4 Mg/yr) is also well below the control threshold (50 Mg/yr). As stated earlier, because the maximum VOC and HAP emission potential occurs at the time the waste is last placed into the landfill and shortly thereafter, emissions from waste decomposition decreases with time as the waste decays. Consequently, current and future methane and NMOC emissions will be less than those that occurred at the cessation of routine disposal operations in 1968. Thus, airborne emissions from the OLF do not pose a risk to health or the environment.[2]

6.4.3 Subsurface VOC Sources

VOCs such as carbon tetrachloride and 1,1,1-trichloroethane were used at RFETS as solvents, cleaning agents, and so forth, in support of weapons component manufacturing. Their use, storage, handling, and disposal at RFETS created some areas of known VOC contamination in soil. Areas of VOC-contaminated soil have been addressed through RFCA accelerated actions or, after evaluation in accordance with RFCA, determined to qualify for No Further Accelerated Action (NFAA).

A study of ambient airborne VOC concentrations in the IA was undertaken in June 1995 and completed in August 1996. Details of the study design can be found in the Final Interim Measure/Interim Remedial Action (IM/IRA) Implementation Plan for the Rocky Flats IA (DOE 1995). Study results can be found in the Annual Report, IM/IRA for the Rocky Flats IA (RMRS and K-H 1997). The airborne VOC data were evaluated to determine whether there may be evidence that unidentified VOC contamination exists as a potential source of airborne VOC emissions. The study tested for 31 different hydrocarbons known or believed to exist at RFETS. Of these, eight compounds were detected; one of these, acetone, is neither a HAP nor a VOC, and has no significance from an air quality perspective. The data from this study are considered a conservative snapshot of RFETS's VOC emissions potential for the following reasons:

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[2] LFG was also evaluated in the Draft IM/IRA for IHSS Group SW-2, IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond, IHSS 196 (DOE 2004c).

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- They were collected at a time when RFETS still maintained an inventory of VOC-containing solvents, cleaners, and so forth, which have since been removed.
- Less soil remediation had been completed than is currently the case.
- It is expected that a greater mass of VOC soil contamination existed at the time (that is, some amount has volatilized since then), resulting in a higher emissions potential than at present.

For comparison, ambient air concentration data for VOC HAPs were obtained for nearby sampling locations. Table 6.2 presents the results of this data assembly. The 1998 CDPHE ambient average data are from five samplers located around the perimeter of RFETS (designated X-1, X-2, X-3, X-4, and X-5). The sampler locations are shown on Figure 6.2.

Quality assurance (QA) samples included as part of the study indicated that cross-contamination or insufficient cleaning of some of the sample canisters may have contributed to elevated results for acetone, toluene, and 1,1,1-trichloroethane throughout the project (RMRS and K-H 1997). Also, several of the detected compounds, including benzene, toluene, and xylene, are common constituents of automobile exhaust and are often present at detectable concentrations throughout the Denver airshed (CDPHE 2004). Finally, it should be noted that there was a known carbon tetrachloride source at RFETS that had not been remediated at the time of the study, but was remediated in 2004.

Table 6.2 also lists available toxicological benchmark levels, as well as background levels for pollutants included in EPA's 1996 National-scale Air Toxics Assessment (NATA) (EPA 2004). Average VOC HAP concentrations measured in the IA study were below detection levels for all compounds; therefore, no average concentrations are shown in Table 6.2. The maximum values from the RFETS study are 24-hour averages and are best compared to the short-term (acute) toxicological reference levels shown. Annual average concentrations from the CDPHE samplers located at the site perimeter may be compared with the chronic benchmarks to indicate the significance of VOC HAPs to which the general public may be exposed (including any RFETS-derived HAPs and HAPs from other regional sources).

Several conclusions can be drawn from the data. (Note that this discussion excludes acetone, because it is neither a HAP nor a VOC.) First, the RFETS data, consisting largely of nondetects, reveal no significant persistent sources of VOC HAP emissions in the IA at the time of the study. Maximum 24-hour concentrations measured were orders of magnitude below any of the short-term toxicological benchmark levels and no adverse short-term health effects would be expected at these levels.

Second, the longer-term CDPHE data show VOC HAP concentrations due to all sources at the RFETS perimeter close to or below background levels for pollutants included in the NATA study. EPA defines "background" levels as contributions resulting from natural sources, persistence in the environment of past years' emissions, and long-range transport from distant sources. In other words, background concentrations represent levels of pollution expected even if there had been no recent manmade emissions (EPA 2004).

Where applicable, measured HAP concentrations at the RFETS perimeter were also well below chronic inhalation effect levels published by various sources. CDPHE ceased sampling for VOCs at the RFETS perimeter in July 2001, citing low measured levels of contaminants and noting that the VOCs that were measured "appear to be mainly motor vehicle emissions, rather than Rocky Flats plant emissions" (CDPHE 2001).

Based on the available ambient air monitoring data and the current knowledge of VOC contamination that remains at RFETS, no significant sources of VOC emissions remain following completion of accelerated actions.

6.4.4 Beryllium

The health effects of beryllium exposure in sensitive individuals have been well documented and the U.S. Department of Energy (DOE) Chronic Beryllium Disease Prevention Program rule, 10 CFR 850, establishes beryllium exposure limits and other requirements for RFETS workers. Beryllium is a HAP and EPA has promulgated beryllium emission limits for certain beryllium industry categories in 40 CFR 61, Subpart C. Unlike certain radioactive materials at RFETS, however, beryllium contamination was largely confined to building and equipment surfaces in areas where beryllium was processed, stored, or used and where beryllium-contaminated waste was managed. Soil and other environmental media at RFETS do not show significant levels or aerial extent of beryllium contamination; therefore, with the completion of accelerated actions, no significant source of airborne beryllium emissions exists. It is important to note, however, that regional soils contain small amounts of naturally occurring beryllium, which will continue to be suspended in dust following closure.

DOE implemented project monitoring for beryllium in ambient air during decommissioning and demolition of facilities with a history of significant beryllium operations at RFETS (that is, Buildings 444/447, 865, and 883). The scope of project monitoring is described in the Integrated Monitoring Plan (IMP) Background Document (DOE et al. 1997) and the Final Sampling and Analysis Plan (SAP) for Quantification and Characterization of Potential Beryllium Release to the Ambient Air During Building Demolition at the Rocky Flats Environmental Technology Site (URS Group 2001). Ambient monitoring performed around two demolition operations (Buildings 111 and 865) serves to quantify expected levels of airborne beryllium during and following accelerated actions (beryllium monitoring data are contained in the RFETS monitoring data included in Attachment 2).

Building 111 was demolished during November and December 2001. The building was not contaminated with beryllium; rather, the demolition provided an opportunity to establish "baseline" levels of beryllium in RFETS air. (As noted above, beryllium occurs naturally in the RFETS environment in small amounts.) Beryllium concentrations were measured using six ambient air samplers arrayed in a circular fashion around Building 111, as close as possible to the demolition considering neighboring buildings and roads. Beryllium samplers ran 8 to 10 hours per day during project activity, with the filters exchanged and analyzed daily. The results were statistically distinguishable from zero and from the minimum detectable level, demonstrating that the sampling and

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analysis protocols were adequate to reliably quantify beryllium in ambient air at and below concentrations of interest.

The mean beryllium concentration for all six locations (30-day average) was 1.7×10^{-5} micrograms per cubic meter ($\mu g/m^3$). An appropriate benchmark for comparison is contained in the "National Emission Standard for Beryllium" (40 CFR 61, Subpart C), which limits ambient beryllium concentrations in the vicinity of a source subject to the standard to 1.0×10^{-2} $\mu g/m^3$ as a 30-day average (EPA 1973). (Note that no RFETS sources existing at the time of this monitoring study, including building demolition, were subject to this regulation because the regulation only applies to certain specific source types. The concentration limit, however, provides an appropriate benchmark concentration for comparison because it has been established by EPA at levels designed to protect public health.) Measured concentrations around Building 111 demolition indicated a qualitative correlation to the dustiness of the air around the project and to stronger winds, with environmental beryllium being detected even prior to demolition activity. The resulting baseline concentrations established by this monitoring program are likely to be representative of airborne beryllium concentrations following completion of accelerated actions.

Beryllium monitoring was also performed during demolition of Building 865 and during removal of the slab. Building 865 was part of the RFETS research and development program. The building housed metalworking equipment for the study of nonplutonium metals and the development of alloys and prototype hardware. Operations included metalworking, machining, and metallurgical laboratory operations. Beryllium contamination occurred from operations involving mixing beryllium powders with other metals and compressing them into shapes, casting and heat-treating furnaces, and beryllium electrorefining.

A six-sampler network was employed to measure ambient airborne beryllium concentrations during Building 865 demolition and slab removal between July 21, 2003, and December 12, 2003. The sampling schedule included a baseline sampling period prior to the start of demolition, a brief pause between building demolition and slab removal, and baseline confirmation sampling following completion of slab removal. Some results greater than the predemolition baseline were observed; however, no results approached or exceeded the EPA benchmark concentration of 1.0×10^{-2} $\mu g/m^3$ 30-day average. These results confirmed that project controls were effective in minimizing the migration of beryllium contamination from the building and slab removal. The mean airborne beryllium concentration measured over the project was 1.2×10^{-4} $\mu g/m^3$, with a maximum measured concentration of 3.7×10^{-3} $\mu g/m^3$. Measured concentrations were consistently an order of magnitude lower than the 40 CFR 61, Subpart C benchmark, indicating beryllium in air will not be a concern following completion of all building demolitions and accelerated actions.

6.4.5 Other Contaminants

A variety of other air pollutants and emission sources at RFETS were historically subject to federal and state regulations. Regulated sources included the steam plant boilers;

diesel-, gasoline-, and natural gas-fired equipment such as generators and compressors; vehicle refueling operations; sanitary landfill construction and operation; paint spray booths; sanitary waste filter press; the Building 776 Supercompactor; the Building 374 Spray Dryer; aggregate storage piles; tanks containing volatile substances; open burning activities; ODS releases from refrigerant leaks and maintenance operations; and fugitive dust emissions from earthmoving activities and other mechanical disturbances.

In addition to radionuclides, airborne emissions of ODS, CO, NO_x, SO_2, VOCs, and PM_{10} have been regulated at RFETS. Maximum potential RFETS emissions of other pollutants, such as a number of CAA HAPs and Colorado "noncriteria reportable" pollutants, were historically emitted in such small amounts that specific regulatory requirements were not triggered.

Regulatory requirements applicable to RFETS emission sources included submitting Air Pollutant Emission Notices (APENs) for new emission units or activities with emissions above a reporting threshold; obtaining construction permits for nonexempt new or modified activities; and obtaining a site-wide Title V operating permit. An operating permit is required for all sources with potential emissions above certain thresholds. In RFETS's case, potential emissions of NO_x, primarily from the steam plant boilers and diesel-fired equipment, exceeded 100 tons per year, the applicable operating permit threshold, at the time that operating permit applications were due in 1996. RFETS's Title V operating permit (received July 1, 2002) was revised as decommissioning proceeded and sources of regulated emissions were removed from the site. The permit was retained as long as the aggregate potential NO_x emissions from diesel-fired equipment exceeded the 100-ton-per-year threshold. With completion of accelerated actions, activities covered by APENs and permits have been removed or shut down, and the APENs and permits have been cancelled. No sources remain that require APENs or permits.

6.5 Nature and Extent of Air Contamination

With the completion of accelerated actions under RFCA, sources of ongoing emissions to air include the following:

- Resuspension of residual radioactive contaminants attached to surface soil particles; and
- Volatilization/release of VOCs from residual subsurface contamination and the closed landfills.

However, as described in Site Background (Section 1.0), sources of radionuclide and VOC contamination were removed during accelerated actions conducted pursuant to RFCA. Former processing and waste storage buildings have been decommissioned, decontaminated, and demolished. Soils have been evaluated in accordance with risk-based action levels (ALs) established in RFCA Attachment 5, Action Levels and Standards Framework for Surface Water, Groundwater, and Soils (ALF) (DOE et al. 1996), and have either been cleaned up in accordance with ALF or determined to be subject to NFAA. As described in Section 6.4.3, VOC emissions are rapidly decreasing

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and present no health or environmental concerns at present and future levels in ambient air.

Airborne radionuclide contamination following completion of accelerated actions is primarily caused by resuspended plutonium or americium in surface soil, because these substances were dispersed on and off RFETS by wind. The screening process carried out in this section identified only resuspended plutonium, americium, and uranium from surface soils as air pollutants of potential concern worth quantifying further, primarily because their long-radioactive half-lives means they will persist in the environment and, therefore, represent an ongoing source of potential emissions in the future.

Accelerated actions have removed surface soil contaminated with plutonium, americium, or uranium above the ALF soil ALs, greatly limiting potential future emissions. However, the diffuse, remnant contamination in surface soil will continue to result in small amounts of radionuclide particles in air due to the ongoing resuspension and movement of soil (fugitive dust) by wind, such as occurs on all open lands along the Front Range of Colorado. The remaining areas of plutonium, americium, or uranium contamination above background levels are described in more detail in Section 3.0, Nature and Extent of Soil Contamination. Ongoing emissions of plutonium, americium, and uranium from the remaining areas with actinide contamination above background levels are further evaluated in Section 7.0 of this report to quantify airborne concentrations.

6.6 References

CDPHE, 2001, Air Monitoring Data Report on the Rocky Flats Monitoring Network, 2001, Denver, Colorado.

CDPHE, 2004, Urban Air Toxics Program. For presentations and reports on concentrations of toxic air pollutants in Denver and elsewhere in Colorado, see: www.cdphe.state.co.us/ap/planning.asp#Urban%20Air%20Toxics%20Program

DOE, 1995, Final Interim Measure/Interim Remedial Action Implementation Plan for the Rocky Flats Industrial Area, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 1997, Letter from Keith Klein, DOE, Rocky Flats Field Office, to Kirsten King, CDPHE, RE: Notification of Non-Applicability to the Colorado Department of Public Health and Environment that the Site Landfills are not Subject to New Source Performance Standards and Emission Guidelines for Landfills (CAP-086-97), July 10.

DOE, 1999, Radionuclide Air Emissions Annual Report for Calendar Year 1998, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2000, Radionuclide Air Emissions Annual Report for Calendar Year 1999, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2001, Radionuclide Air Emissions Annual Report for Calendar Year 2000, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2002a, Radionuclide Air Emissions Annual Report for Calendar Year 2001, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2002b, Rocky Flats Environmental Technology Site Quarterly Environmental Monitoring Report: October-December 2001, Rocky Flats Field Office, Golden, Colorado, February.

DOE, 2003a, Radionuclide Air Emissions Annual Report for Calendar Year 2002, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2003b, Rocky Flats Environmental Technology Site Quarterly Environmental Monitoring Report: July-September 2003, Rocky Flats Field Office, Golden, Colorado, November.

DOE, 2004a, Radionuclide Air Emissions Annual Report for Calendar Year 2003, Rocky Flats Field Office, Golden, Colorado, June.

DOE, 2004b. Final Interim Measure/Interim Remedial Action for IHSS 114 and RCRA Closure of the RFETS Present Landfill, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004c Draft Final Interim Measure/Interim Remedial Action of IHSS Group SW-2, IHSS 115, Original Landfill and IHSS 196, Filter Backwash Pond, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, EPA, and CDPHE, 1996, Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden, Colorado, July 19.

DOE, EPA, and CDPHE, 1997, Rocky Flats Cleanup Agreement Integrated Monitoring Plan and subsequent annual updates, Rocky Flats Environmental Technology Site, Golden, Colorado.

EG&G, 1992, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

EPA, 1973, Title 40 of the Code of Federal Regulations, Part 61, Subpart C, "National Emission Standard for Beryllium," April 6, 1973, and subsequent amendments.

EPA, 1989, Title 40 of the Code of Federal Regulations, Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon From Department of Energy Facilities," December 15, 1989, and subsequent amendments.

EPA, 1995, Compilation of Air Pollutant Emission Factors, Fifth Edition, Volumes I and II, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, January.

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EPA, 1996a, Title 40 of the Code of Federal Regulations, Part 60, Subpart WWW, "Standards of Performance for Municipal Waste Landfills," March 12, 1996, and subsequent amendments.

EPA, 1996b, Title 40 of the Code of Federal Regulations, Part 60, Subpart Cc, "Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills," March 12, 1996, and subsequent amendments.

EPA, 2004, National-scale Air Toxics Assessment. Results available via www.epa.gov/ttn/atw/nata.

K-H, 2002, "Landfill Gas Generation Report" (Appendix E to the Conceptual Design for the Present Landfill Cover), Rocky Flats Environmental Technology Site, Golden, Colorado.

RMRS and K-H, 1997, Annual Report Interim Measure/Interim Remedial Action for the Industrial Area at the Rocky Flats Environmental Technology Site, Golden, Colorado, March.

URS Group, 2001, Sampling and Analysis Plan for Quantification and Characterization of Potential Beryllium Release to the Ambient Air During Building Demolition at the Rocky Flats Environmental Technology Site, Golden, Colorado.

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Table 6.1
Summary of Air Emissions Sources of Historical Interest and Current Status

Historic Source of Airborne Emissions	Primary Pollutants Emitted	Nature of Emissions	Status/Conclusions	Ongoing Emission Source?
Radionuclide processing/operations and waste handling/storage	Pu, Am, U	Point source emissions from stacks and vents	No potential sources remain following completion of accelerated actions	No
Radionuclide surface soil contamination (resuspension by wind)	Pu, Am, U	Fugitive emissions	Minor continuing emissions from residual soil contamination below RSALs	Yes
Tritium	Tritium	Primarily point source emissions from stacks and vents	No potential sources remain (since at least 2000)	No
Beryllium processing/operations and waste handling/storage	Be	Point source emissions from stacks and vents	No potential sources remain following completion of accelerated actions	No
Environmental restoration	Pu, Am, U VOCs PM/PM_{10} CO, NO_x, SO_2, VOCs, PM_{10} (from construction equipment and traffic)	Fugitive and tailpipe emissions	No potential sources remain following completion of accelerated actions	No
Decommissioning/building demolition	Pu, Am, U PM/PM_{10} CO, NO_x, SO_2, VOCs, PM_{10} (from construction equipment and traffic)	Fugitive and tailpipe emissions	No potential sources remain following completion of accelerated actions	No
Landfills	VOCs, HAPs LFG (methane and CO_2)	Fugitive emissions	Minor continuing emissions below regulated levels	Yes
VOC soil contamination	VOCs, HAPs	Fugitive emissions	Minor continuing emissions from residual contamination below ALs; past sampling during period of higher potential emissions shows ambient levels below levels of concern	Yes

Table 6.1
Summary of Air Emissions Sources of Historical Interest and Current Status

Historic Source of Airborne Emissions	Primary Pollutants Emitted	Nature of Emissions	Status/Conclusions	Ongoing Emission Source?
Uncontaminated fugitive dust sources (traffic, soil disturbances, stockpiles, street sanding, and so forth)	PM/PM_{10}	Fugitive emissions	No potentially significant sources remain following completion of accelerated actions; assuming no significant soil disturbing activities in future	Possible at low level if soil is mechanically disturbed, or from vehicle operations
Fuel combustion, gasoline dispensing, paint spray booths, tanks, refrigerant leaks, open burning, and so forth	CO, NO_x, SO_2, PM_{10}, VOCs, HAPs, ODS	Both point source and fugitive emissions	No regulated sources/sources requiring permits or APENs remain following completion of accelerated actions	No

Notes:

Am	=	americium	AL	=	Action levels
APEN	=	Air Pollutant Emission Notice	Be	=	beryllium
CO	=	carbon monoxide	CO_2	=	carbon dioxide
EPA	=	U.S. Environmental Protection Agency	HAP	=	hazardous air pollutant; as used here, includes Colorado noncriteria reportable pollutants
LFG	=	landfill gas			
NOx	=	nitrogen oxides	ODS	=	ozone-depleting substance
PM/PM_{10}	=	particulate matter/fine particulate matter	Pu	=	plutonium
RSAL	=	Radionuclide Soil Action Level	SO_2	=	sulfur dioxide
U	=	uranium	VOC	=	volatile organic compound

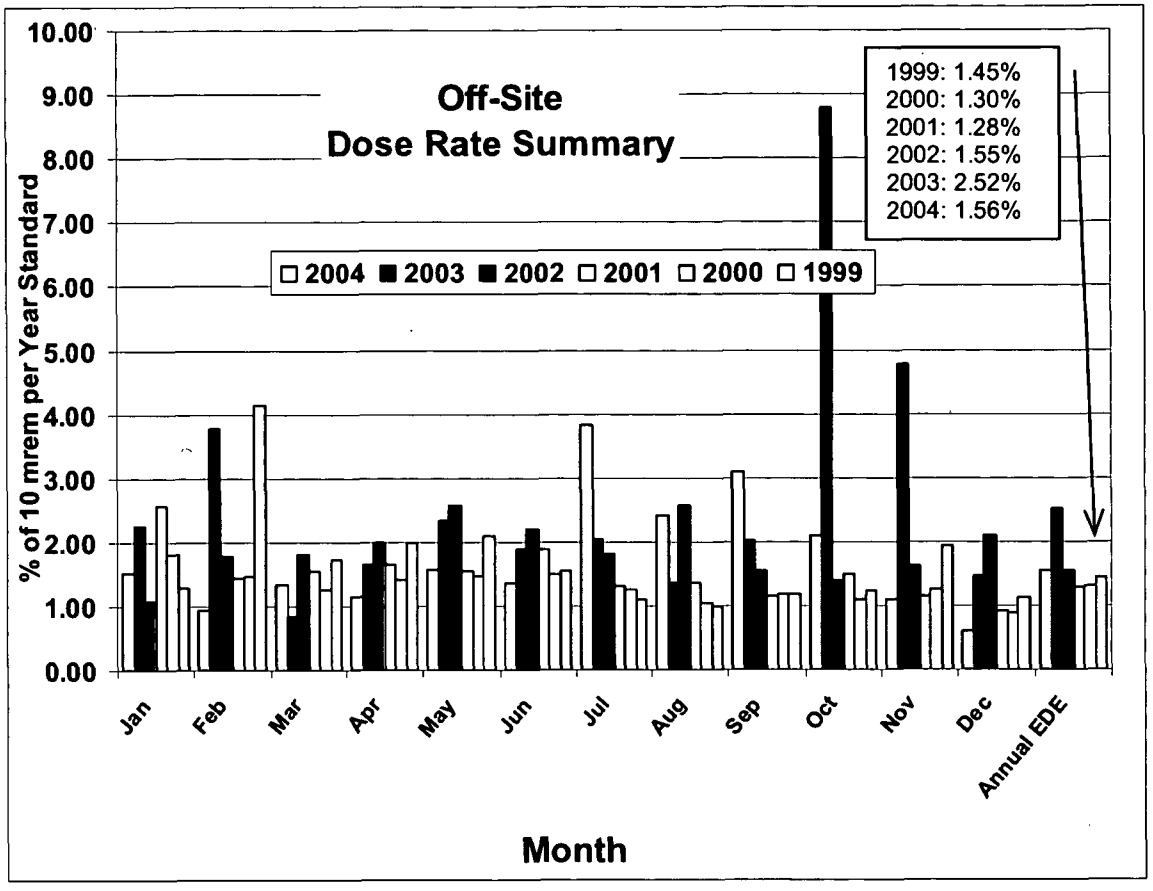
Table 6.2
Results Summary – 1995-1996 RFETS Ambient HAP Sampling

Compound	Sampler S-104 (ppb)	Sampler S-301, -302 (ppb)	Sampler S-008 (ppb)	Sampler S-205 (ppb)	Sampler S-116 (ppb)	Inhalation Short-term Benchmark Concentration (ppb)	1998 CDPHE Annual Average Concentration (ppb)	Inhalation Long-term Benchmark Concentration (ppb)
1,1,1-Trichloroethane	—	1/—	1/—	—	—	ATSDR MRL: 2,000 Cal REL: 12,500	0.06 ± 0.2	Cal REL: 183
1,1,2-Trichloroethane	—	1/—	1/—	—	—	ACGIH TLV: 10,000 OSHA PEL: 10,000	—	—
Carbon tetrachloride	2/—	—	2/—	—	—	ATSDR MRL: 200 Cal REL: 300	0.13 ± 0.04	ATSDR MRL: 30 Cal REL: 6.4 Background: 0.14
Methylene chloride	—	1/—	—	—	—	ATSDR MRL: 600 Cal REL: 4,000	0.05 ± 0.13	ATSDR MRL: 300 Background: 0.04
Benzene	—	2/—	3/—	3/—	—	ATSDR MRL: 50 Cal REL: 400	0.18 ± 0.09	Chronic Inhalation RfC: 9.3 Background: 0.15
Toluene	—	4/—	3/—	5/—	—	ATSDR MRL: 1,000 Cal REL: 9,800	0.31 ± 0.18	ATSDR MRL: 80 Chronic Inhalation RfC: 105
Xylene (m,p)	—	—	1/—	—	—	ATSDR MRL: 1,000 Cal REL: 5,050	0.10 ± 0.08	ATSDR MRL: 100 Chronic Inhalation RfC: 22.7

Notes: "—" indicates a nondetect. For RFETS results, first value is maximum concentration, second value is average concentration (all below detection levels). Results based on 24-hour samples.
S-116 was the upwind (control) sampler for most of the 1-year study due to predominant wind directions.
Colorado Department of Public Health and Environment (CDPHE) HAP samplers were installed at sampling locations X-1, X-2, X-3, X-4, and X-5 at the RFETS fenceline (Figure 6.2).
The Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs) are daily exposures for the specified duration that are likely to be without an appreciable risk of noncancer adverse effects. Short-term MRLs are for 1-14 days exposure; chronic MRLs are for > 365 days of exposure.
The California Environmental Protection Agency (Cal) Reference Exposure Levels (RELs) are concentrations at which no health effects are anticipated.
MRLs and RELs are listed on EPA's Air Toxics Website at www.epa.gov/ttn/atw/toxsource/summary.html.
ACGIH TLV, OSHA PEL are 8-hour time-weighted average concentrations based on a normal workweek. ACGIH and OSHA benchmark concentrations are from ATSDR at www.atsdr.cdc.gov/mrls.html.
Chronic inhalation RfC, from EPA's Integrated Risk Information System (IRIS), gives effect levels for noncancer effects due to chronic exposure (see www.epa.gov/iris).
Background levels are from EPA's 1996 National-scale Air Toxics Assessment.
Long-term benchmark concentrations are converted to ppb, where necessary, from milligrams or micrograms per cubic meter at sea level pressure.

ACGIH	=	American Conference of Governmental Industrial Hygienists	OSHA	=	Occupational Safety and Health Administration
PEL	=	Permissible Exposure Level	ppb	=	parts per billion
RfC	=	Reference Concentration	TLV	=	Threshold Limit Value

Figure 6.1
Maximum Monthly Measured Off-Site Dose Rates for 1999-2004



Note: "Off Site" refers to locations outside current RFETS property fenceline.

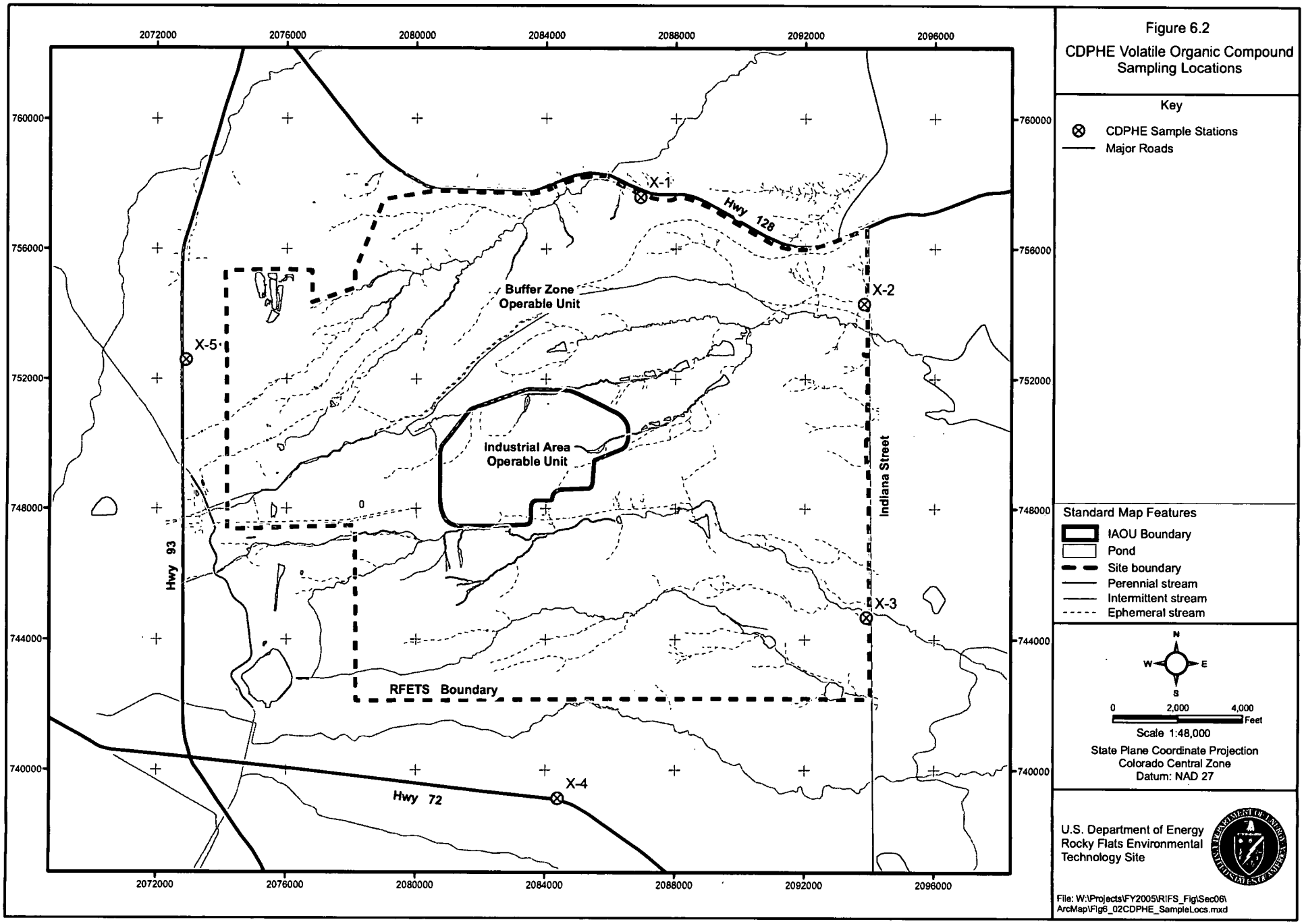

2072000
2076000
2080000
2084000
2088000
2092000
2096000
760000
756000
752000
748000
744000
740000
X-1
X-2
X-3
X-4
X-5
Hwy 128
Buffer Zone
Operable Unit
Industrial Area
Operable Unit
Indiana Street
Hwy 93
Hwy 72
RFETS Boundary
Figure 6.2
CDPHE Volatile Organic Compound
Sampling Locations
Key
CDPHE Sample Stations
Major Roads
Standard Map Features
IAOU Boundary
Pond
Site boundary
Perennial stream
Intermittent stream
Ephemeral stream
N
W
E
S
0
2,000
4,000
Feet
Scale 1:48,000
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27
U.S. Department of Energy
Rocky Flats Environmental
Technology Site
File: W:\Projects\FY2005\RIFS_Fig\Sec06\
ArcMap\Fig6_02CDPHE_SampleLocs.mxd

Figure 4.1

UHSU Monitoring Well Locations

KEY

- Well installed since January 1, 2000
- Well installed between January 1, 1990 and December 31, 1999
- Well installed prior January 1, 1990

Standard Map Features

- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary
- Topographic contour (20-foot)
- Industrial Area Operable Unit

N W E S

0 600 1,200 Feet

Scale 1:7,200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental
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UHSU RIFS GW Well map PLATE.mxd

SW-A-005299

Figure 4.2

LHSU Monitoring Well Locations

KEY

- Well installed since January 1, 2000
- Well installed between January 1, 1990 and December 31, 1999
- Well installed prior January 1, 1990

Standard Map Features

- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary
- Topographic contour (20-foot)
- Industrial Area Operable Unit

N
W E
S

0 600 1,200 Feet

Scale 1:7,200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

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Technology Site

U:\Projects\FY2005\RIFS_Fig\Sec04\ArcMap\
LHSU RIFS GW Well map PLATE.mxd

140 SW-A-005299

Figure 5.1

Surface Water Monitoring Station Locations

KEY

- Sample collected since January 1, 2000
- Sample collected between January 1, 1995 and December 31, 1999
- Sample collected between June 28, 1991 and December 31, 1994

Standard Map Features

- Pond
- Perennial stream
- Intermittent stream
- Ephemeral stream
- Site boundary
- Topographic contour (20-foot)
- Industrial Area Operable Unit

N
W E
S

0 600 1,200 Feet

Scale 1:7,200

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
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Technology Site

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new Fig5_01SW_Loc_PLATE.mxd

Figure 5.2

Sediment Sampling Locations